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PIT AND QUARRY

OCTOBER 1947

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Slag from Blast Furnace Flowing into Lightweight Aggregate Machine.

In this Issue

Record of National Lime Assn. • Spectographic Determination of Minor Elements in Portland Cement—Part I • Natl. Sand and Gravel Assn. Directors' Meeting • Delayed Action Blasts at New York Trap Rock Quarries • Palmetto's Expansion Program

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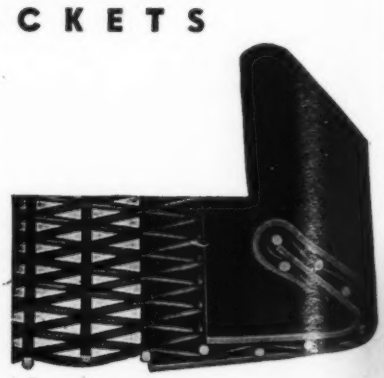

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PIT AND QUARRY

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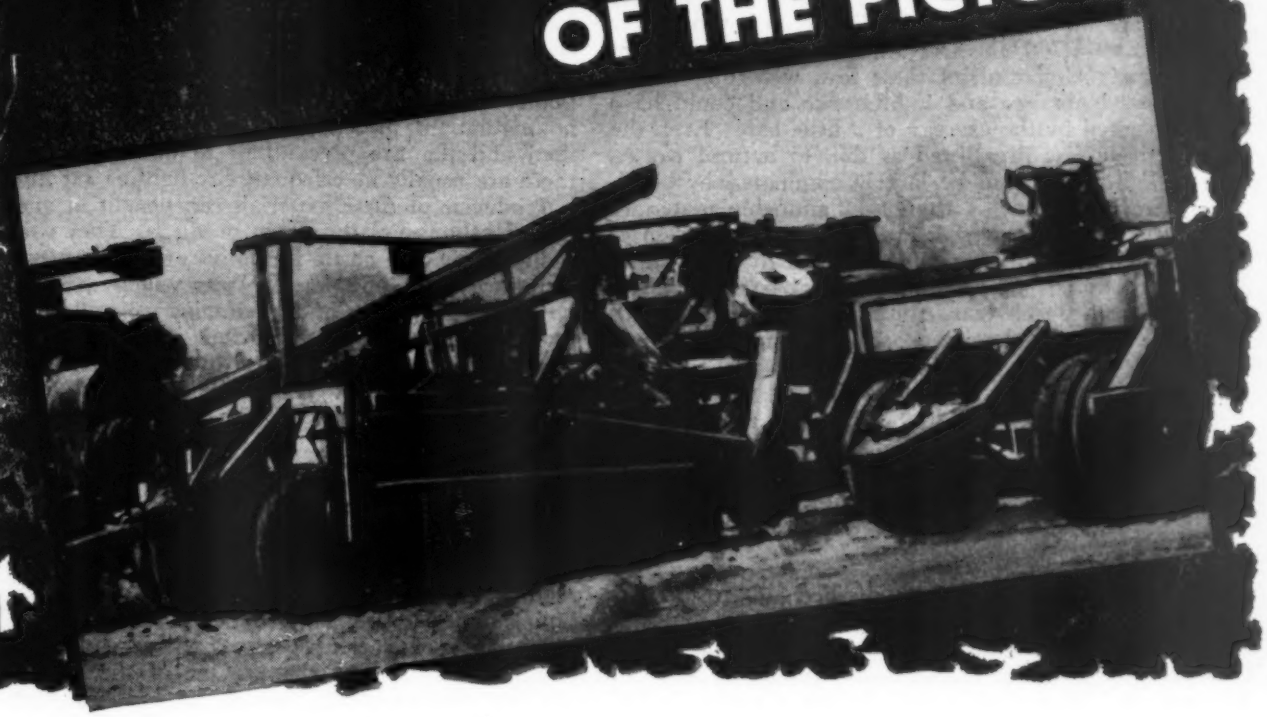

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EDITORIAL

Fire Prevention Week

THE week of October 5-11, 1947, has been designated as Fire Prevention Week by President Truman and the governors of the several states. This week, dedicated to an important cause, brings forcefully to our attention the terrific toll taken by fire. Fire losses affect us all directly or indirectly, but we ordinarily do little to prevent them.

There are in these highly-civilized and progressive United States 1,700,000 fires annually, taking a toll of 11,000 lives! Almost all of these fires were due to our carelessness, ignorance and indifference and could have been prevented by the exercise of a little care. Even the comparatively few fires listed as due to natural causes, such as lightning, could be largely eliminated by building, wherever possible, with non-inflammable materials.

Producers of the materials used in the construction of fireproof buildings deplore the fact that there are hundreds of thousands of dwelling, hotel, apartment, school and theater fires each year, causing the loss of thousands of lives. They say that noncombustible materials such as concrete should be used more widely to lower this frightful toll, and they are right. But, as the first step in this direction they should take a look at their own plants, most of which are built largely of wood, and in most of which are found nearly all the major hazards. Among these are defective wiring, inflammable waste, smoking—in spite of warning signs—careless handling of inflammable liquids, etc. There are more than 28,500 fires in manufacturing plants each year—80 per day—and the producers of the materials which go into concrete have their share of these, as a perusal of the news in nearly every issue of PIT AND QUARRY will prove. Their fires also are usually more destructive, as most of these plants are located outside of settled communities, where no regulations prescribe the type of construction to be used and the fire precautions to be taken, and where there are usually no adequate fire-fighting facilities.

Producers of these materials can benefit in many ways through the use of their own products. They would thus reduce their own costly fire losses and their present high insurance rates and have plants which are more economical to operate and maintain, as well as cleaner, more pleasant and safer to work in. Such construction would be more attractive and a good advertisement for concrete construction. It would also call public attention to the fireproof character of concrete construction.

A Wise Decision

WHEN Congress recently decided to reverse its previous stand on agricultural aid and to continue, at least for another year, its support of the agricultural conservation program, it took an important step in insuring the future well-being of this country. Since this decision was made, the 1947 crop prospects have dropped to a point where it seems that we will be doing well to feed ourselves, much less a large part of the rest of the world. A complete withdrawal of government support from the conservation program would have meant an almost immediate decrease in the productivity of our soil and a resumption of the large-scale erosion which had been rapidly reducing our acreage of arable land.

The conservation program has been doing the things which the individual farmer could not do to reduce erosion loss and has also made it practically imperative for him to use liming materials and thereby to learn of their direct economic value to him. It would have been disastrous suddenly to withdraw the support of this program just at a time when farmers and the general public were beginning to realize that such measures were vital to us all. It would be far better—and this appears now to be the prospect—to withdraw support gradually, and to increase from year to year the participation of the individual farmer, farming areas, and whole communities in the cost of various types of conservation work.

Judging from reports, it appears that Congress was influenced in its action by a flood of protests from farmers and the general public against withdrawal of its support of the program. This indicates that one of the greatest educational programs ever undertaken has had some effect, and that we are beginning to realize that steps must be taken to conserve our natural resources. Most of us are, however, concerned only with food as a volume commodity and little is as yet known about what the use of liming materials and other minerals will do to the nutritive values of various grains and vegetables and the animals that feed on them. One of the first to point out the effect that soil quality has on our health and growth was Dr. William A. Albrecht, Department of Soils, University of Missouri. In an article in the July, 1946, issue of PIT AND QUARRY he presented convincing proof that the liming of soils is vital to the health of the nation. More needs to be known about this important subject.

It is evident, therefore, that those interested in the continued and increased use of liming materials have several good reasons for continuing to mold public opinion. Continued efforts must be made to convince the public and Congress of the importance of continuing support of the program on a gradually-reduced scale; farmers must be sold on the direct value to them of soil conservation practices; and further research should be made to increase our knowledge of the soil and the plants that grow in it. Every producer of liming material should consider himself personally responsible for conveying to farmers and the general public the important information provided by the government agents, the trade associations and the trade magazines. This information should be broadcast orally, through direct mail, and through local newspaper and radio advertising. Only by accepting such important and demonstrated facts and getting the maximum benefit from them can we insure our future health and prosperity.

Walter E. Trauffer

Joint Report on Liming Shows All-Time High Reached in U.S. in 1946

A bulletin issued recently by the National Crushed Stone Association's Agricultural Limestone Division consisted of a compilation showing the approximate consumption of liming materials during 1946.

A total of 29,462,200 tons established an all-time high for the industry, representing an increase of approximately 32 percent over the 22,357,403 tons consumed in 1945. Almost all of that increase was accounted for by agricultural limestone. A total of 27,832,547 tons of agstone was used during 1946.

The report has been issued annually for the last 17 years by the National Lime Association, and now it is issued as a joint report by the N.L.A. and the Agricultural Limestone Division.

The following states consumed more than 1,000,000 tons each of liming materials: Pennsylvania, Tennessee, Ohio, Indiana, Illinois, Wisconsin, Iowa and Missouri.

James Boyd Named Director Of U. S. Bureau of Mines

James Boyd, former dean of the Colorado School of Mines, became director of the United States Bureau of Mines on August 27 under an interim appointment, made by President Truman. His nomination was sent to the Senate in March, but no action was taken at that time. The delay was said to have been caused by UMW opposition.

Increased Coal, Labor Costs Call for Higher Cement Prices

Increases in cement prices have been announced by the following companies: Lehigh Portland Cement Company, Nazareth Cement Company, Pennsylvania-Dixie Cement Company, Lone Star Cement Corporation, Alpha Portland Cement Company, Hercules Cement Company and Whitehall Cement Company. Reasons given for the price hikes, varying for the different companies, were increased costs of labor and coal.

An official of the Alpha Portland Cement Company, in announcing an increase of 10 cents per barrel, stated that while cement prices had risen only 29 percent since 1939, labor costs had gone up 67 percent and coal prices 87 percent.

According to Lloyd Brannan, the Brannan Sand & Gravel Company, Denver, Colo., will soon start work on a new sand and gravel plant with a capacity of 300 t.p.h. This expansion move will give the company a total capacity of 2,000 t.p.h. in all six of its plants.

Coming Events

October 1-3, 1947 — Asheville. Annual fall meeting, National Industrial Sand Association, Grove Park Inn.

October 8 and 9, 1947 — Chicago. Safety Congress, Cement and Quarry Section, Stevens Hotel.

December 1-6, 1947—New York. 21st Exposition of Chemical Industries, Grand Central Palace.

January 14-15, 1948 — Washington, D. C. Third annual meeting, National Agricultural Limestone Association, Hotel Statler.

January 19-23, 1948 — Cincinnati. 32nd annual convention and exhibit, National Sand and Gravel Association, Netherland Plaza Hotel.

January 26-28, 1948—Cincinnati. 31st annual convention and exhibit, National Crushed Stone Association, Netherland Plaza Hotel.

January 29-30, 1948—Cincinnati. 3rd annual convention and exhibit, Agricultural Limestone Division, National Crushed Stone Association, Netherland Plaza Hotel.

February 9-12, 1948—Dallas. Annual convention, Associated General Contractors of America, Inc., Baker and Adolphus Hotels.

July Construction Volume Tops June Contracts In East and Mid-West

A contraseasonal increase in investment commitments for construction is revealed in tabulations of project contracts awarded in July in the 37 states east of the Rocky Mountains, it was reported today by the F. W. Dodge Corporation.

The Dodge field staff filed reports on 28,734 projects reaching the contract-award stage last month. These projects have a total value of $660,254,000, representing a gain of 9 percent over the valuation of June contracts and a decline of 8 percent from the total for July of last year. Nearly all districts showed an upswing over June, the exceptions being western Pennsylvania and West Virginia, and the area comprised of eastern Missouri, southern Illinois, western Tennessee and Arkansas. In most areas, the July volume also exceeded the total for July of last year.

Residential and non-residential construction shared in the increase over June, but heavy engineering contract valuations were down 11 percent from the previous month. Nonresidential contracts increased by 21 percent, and residential work showed a 15 percent gain over the preceding month.

The total of all contracts awarded in the 37 Eastern states during the first seven months of this year was $4,152,899,000, reflecting a decline of 11 percent from the comparative total for last year. The 21 percent drop in nonresidential building and the 10 percent decline in building contracts was cushioned by a 9 percent increase in heavy engineering works.

The gain in single-family dwelling construction, both those designed for owners' personal occupancy and those erected for sale or rent by operative builders was particularly marked last month. Apartment house construction contracts declined from the June level but were appreciably higher than the volume reported for July of last year. A total of 28,933 dwelling units was called for in the July contracts, bringing the total for the first seven months to 215,952 against 273,405 reported for the corresponding period of last year.

Franklin Limestone Co. Forms New Corporation—Acquires Three Plants

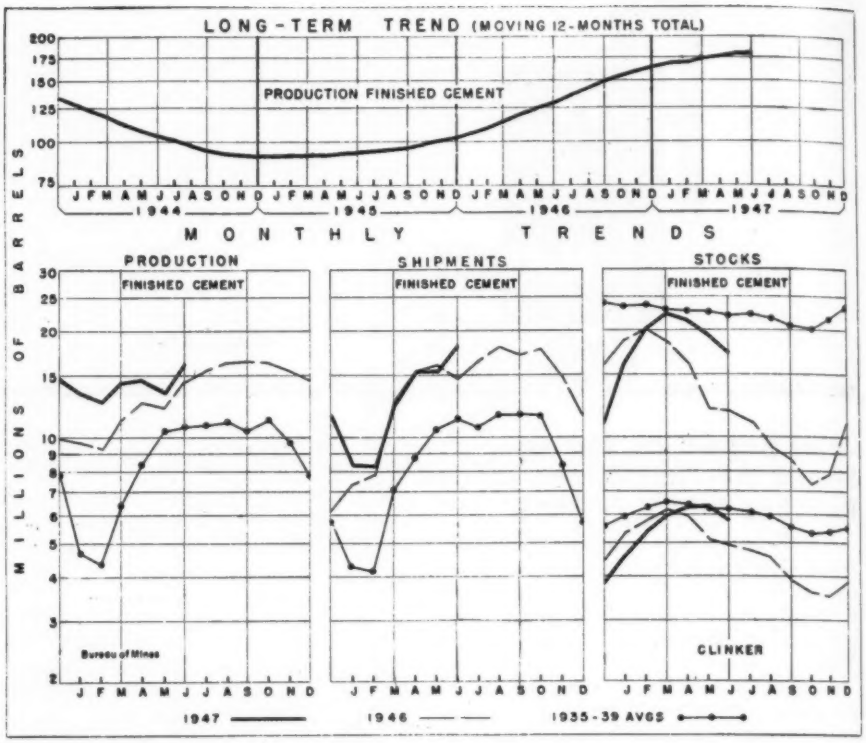
Cale P. Haun and H. E. Rodes announce the formation of a new company to be known as the Franklin Limestone Company, Inc. The firm has purchased the rock crushing plants and quarries formerly operated by the Franklin Limestone Company, the Middle Tennessee Stone Company and the West Tennessee Limestone Company, all of which will now be operated by the Franklin Limestone Company, Inc.

The officers of the new corporation are Cale P. Haun, president; A. B. Rodes, vice-president and general manager; and F. I. Morgan, secretary. The directors of the new corporation are as follows: Henry E. Rodes, A. B. Rodes, Cale P. Haun, Mrs. Julia Fay Haun, W. Joe Wallace, and Lawrence Howard.

The four rock crushing plants of the company are strategically situated in middle Tennessee as follows: In Davidson County near Antioch, in Williamson County at Franklin, in Wilson County at Martha (near Lebanon), in Humphreys County at Rock Hill near Waverly. In these four counties and in the city of Nashville the company maintains truck delivery service and is prepared to furnish all sizes of stone for roads and highway construction, as well as for general construction purposes. The company is also a large producer of agricultural limestone and maintains truck delivery and spreader service.

Franklin's plants are located on all of the railroads serving this area, the L. & N., the N. C. & St. L. Ry. and the Tennessee Central.

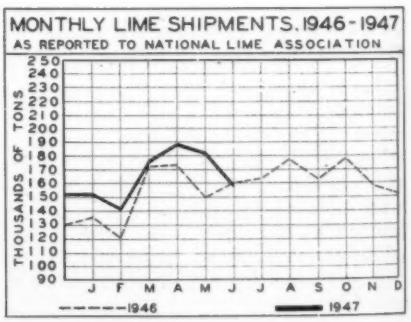
The company operates at Franklin and at Waverly from underground mines. According to the management, one of the advantages of underground operations is that clean, dry rock can be produced despite unfavorable weather conditions. Officials state that in the past two years the company has completed a thorough modernization program, installing the most modern rock-crushing and screening equipment available.



Production of 15,971,000 barrels of portland cement in June, 1947, reported to the U. S. Bureau of Mines was 10 percent greater than that reported for June, 1946. Mill shipments in June, 1947, reached 18,179,000 barrels, a figure 25 percent above that reported in June, 1946. Stocks of finished portland cement on June 30 were 17,180,000 barrels, an increase of 44 percent over the figure reported for June, 1946. Clinker production of 15,494,000 barrels was 7 percent greater than that reported in June, 1946. The industry operated at 81 percent of capacity in June, 1947, as compared with 73 percent a year earlier. Cumulative figures for the first half of 1947 show a gain of 21 percent in production; 5 percent in shipments; and 22 percent in clinker production, as compared with the first six months in 1946.

Demand for cement, as indicated by mill shipments, was higher than in June, 1946, in all but two districts.

The long-term trend in production of finished portland cement is indicated in the accompanying chart. Monthly production, shipments, and stock trends compared with the 1935-39 average are also indicated graphically.



According to data collected by the National Lime Association, 45 companies in June, 1947, shipped 157,715 tons of lime (88,073 quicklime; 69,642 hydrate). Reporting companies represent 46.9 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 370,000 tons. Shipments of lime by users for June, 1947, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	396	12,483
Building	11,632	31,875
Chemical	76,045	24,924
Total	88,073	69,642

• The Farrell Contracting Company of St. Paul, Minn., uses this "Caterpillar" diesel D7 Tractor, equipped with a "Cat" cable control and No. 7S bulldozer, to build an extension to a gravel pit haul road. The unit makes approximately 25 trips per hour.

Europe's Phosphate Famine Called Critical by Ware In Report on Recent Tour

Louis Ware, president of the International Minerals and Chemicals Corporation, who recently returned from a six-weeks' tour of Europe, stated that phosphate is one of the vital commodities needed by war-ravaged countries. In these areas phosphate is in great demand to build up the soil, depleted during the years of World War II.

Mr. Ware said that the world's annual production of phosphate, which is falling far short of the demand, will amount to approximately 14,000,000 tons this year and in 1948. He estimated that the United States will produce about 7,000,000 tons, or twice the amount we turned out before the war. The other major source is North Africa, which is producing at the rate of 5,000,000 to 6,000,000 tons annually. Mr. Ware added that although American production had doubled, export remains about the same. Increased domestic consumption, exorbitant freight rates and lack of shipping space were given as the major reasons for this situation.

According to Mr. Ware, his company's output of phosphate will be increased by 1,000,000 tons annually with the completion of a new mine and plant at Bartow, Fla., next January.

Indiana Limestone Industry Recovers as Controls Cease

The limestone quarries surrounding Bedford and Bloomington, Ind., are receiving new orders and reconsideration of other large limestone orders which were cancelled because of high costs and CPA building restrictions, lifted on July 1.

Current carloadings are now averaging about 8,000 annually, as compared with the low of 4,000 during the depression years, and 30,000 cars in the all-time peak year of 1928. A recent *Wall Street Journal* survey revealed that although approximately 6,000,000 cubic feet of limestone have been taken out of the Indiana quarries, it is estimated the supply will last at least another 100 years.

William G. Riley, president of the Indiana Limestone Co., told the press: "This spring our stone shipments ran away ahead of new orders, but now the situation is reversed. Bookings are more than double billings."

Black and White Coal Mined At Martins Ferry, O., Mine

At the Hanna Coal Company's strip mine near Martins Ferry, O., "white coal" is being mined along with the usual black variety. The unusual operation involves the removal of a bed of limestone.

Hanna engineers installed big crushers which have been turning out approximately 2,000 tons of crushed stone and agricultural limestone per day.

Aggregates Starred in Movie Produced by Iowa Mfg. Company

"A World of Aggregate," a new 40-minute movie photographed in Kodachrome, with music and interesting dialogue, produced for the Iowa Manufacturing Co. of Cedar Rapids, Ia., was previewed by a group of construction publication men, suppliers, association men and distributors at a luncheon in Chicago on July 30.

The picture graphically shows the important part played by aggregate—sand, gravel and crushed stone—in all kinds of construction and what this means to the average citizen in his everyday life and to industry in general. Featured in the film are the various types of equipment built by the Iowa Manufacturing Co. for producing aggregate and mixing asphalt. Animated drawings in color show how the principal types of machines operate, so that even a layman can understand them.

While the movie was designed for men in the construction industry, its theme is so broad that it will appeal to the general public.

Columbia Quarry Company Plants Damaged by Fires On Consecutive Days

Two fires—one at Prairie du Rocher, Ill., and a second at Columbia, Ill.—caused heavy damage to the property and equipment of the Columbia Quarry Company recently. On July 26 a spectacular conflagration raged for three hours at Columbia before the combined efforts of fire departments from four towns brought it under control. It is estimated that about 90 percent of the agricultural limestone plant and equipment was destroyed in the blaze, which for a time threatened the main crusher building also. The loss was estimated variously from $250,000 to $500,000.

The fire is said to have originated in a shorted switch box in a shed. It spread to the rubber conveyor belts, which carried the flames into the three-story agstone building. Work was begun at once on clearing away the debris, and officials stated that they hoped to be back in production within several months.

Only the day before the fire at Columbia a smaller blaze had caused considerable damage at the company's repair garage at Prairie du Rocher. The building, as well as all repair equipment and supplies, was completely destroyed.

$2,300,000 Contract Let For 52-Mile Kaiser Railroad

General-Shea-Pacific has been awarded a $2,300,000 contract to construct 52 miles of standard gauge railroad for Kaiser Company, Inc., in Riverside County, Calif., which will connect Kaiser Steel's new Eagle Mountain iron ore mine with the Southern Pacific main line near the Salton Sea.

Upon completion the line will be one of the longest privately-used standard gauge railroads in the United States and will greatly facilitate the transportation of iron ore used by Kaiser Steel. Equipment to be used on the line will include modern diesel electric engines with dynamic braking.

• Guests at the luncheon and movie preview.

Des Moines Firm to Furnish 1,000,000 Tons of Material For Ft. Gibson Dam Project

Near Muskogee, Okla., giant machines and powerful equipment operated by the M. O. Weaver Construction Company of Des Moines, Ia., are pounding away 16 hours each day to fulfill a contract of about 1,000,000 tons of limestone, gravel and sand for the big $28,000,000 Fort Gibson Dam, five miles away.

Fully automatic operation of nearly all equipment obviates hand labor, although a large force of men is required to operate the plant. The first task of the Weaver organization, which is selling its products directly to the Johnson - Winston - Kiewit Construction Company, was to construct a road from its quarry to the site of the dam. Built to withstand the steady punishment of big diesel-powered trucks, the road is a wide highway surfaced with crushed stone from the Weaver quarry.

With the completion of the road, the work of crushing rock for concrete, to be used in constructing the dam, was begun. More than 460,000 cubic yards of concrete will be needed for the project, which will call for more than 900,000 tons of crushed rock.

L. H. Peterson is manager of the quarry for the Weaver company. When it is geared to full production, states Mr. Peterson, the plant can be expected to produce from 200 to 250 tons of crushed material per hour; and possibly, he adds, it can be stepped up to 300 t.p.h.

Price Reductions Announced On Two Pennsalt Products

A reduction of approximately 10 percent in prices of Pennsalt PM-90 and Pennsalt PM-95, effective September 1, was announced today at the offices of the Pennsylvania Salt Manufacturing Company by George B. Beitzel, vice-president in charge of sales.

Improved manufacturing techniques and increased sales volume have made possible the reduction in the prices of these two specialty acid cleaners, both of which have found wide use as cleaning and descaling agents.

U. S. Railroads Petition I.C.C. For Increases in Freight Rates

In a petition addressed to the Interstate Commerce Commission for higher freight rates, American railroads have requested approval of rates averaging 16 percent increases. Desired new schedules would effect the following changes:

Cement, lime and plaster, maximum of six cents per 100 pounds; sand and gravel, cinders, limestone, marl, slag, crushed stone, etc., 20 cents per net ton.

More Information Received For Scrambled Names Dept.

Numerous letters were received by the editor of PIT AND QUARRY after readers had discovered the inadvertent scrambling of names appearing under the photographs of Mr. Staley and Mr. Hanna (August issue, pages 79 and 80). We are quoting the following from the letter of Robert J. Painter, assistant secretary, American Society for Testing Materials:

"Mr. Hanna, who retired this year as a member of the A.S.T.M. board of directors, has served for two years as chairman on the committee on membership. During those two years the society achieved its best record for net growth, and Mr. Hanna had an important part in achieving this record. He has participated very actively in A.S.T.M. Committee C-1 on Cement, being a chairman of its committee on methods of chemical analysis. Whether it be in connection with his collection of over 20,000 bird eggs, his activities in aiding to guide the Public Library in Colton, Calif., his responsibilities in his company, or his technical work, he demonstrates an intensity of purpose which has achieved excellent results."

• The Fond du Lac Stone Company, Fond du Lac, Wis., uses this "Caterpillar" diesel D4 tractor with a Trackson Traxcavator to load stone into trucks in its quarry operations near Knowles, Wis. The crusher may be seen in the background.

Marquette Safety Expert To Address National Council on Safety Plan

With the national safety championship of the industry already won, the Cape Girardeau, Mo., plant of Marquette Cement Manufacturing Company

Anderson Hayden

continues to run up its unequaled record of accident-free production. On August 12 that plant established another high of over 4,000,000 consecutive man-hours of operations without a lost-time accident. This achievement surpasses the record of 2,000 continuous days, or 3,600,000 man-hours, with which Marquette employees had won last year's safety crown. An elaborate celebration was sponsored by the company to mark the event in December, 1946.

In recognition of Marquette's safety slogan that "four million man-hours without an accident is no accident," Anderson Hayden, safety engineer at the Cape Girardeau plant, has been invited to address the National Safety Congress, annual convention of the National Safety Council, in Chicago on October 8. Hayden will at that time outline and discuss the unique safety program which has met with enthusiastic employee cooperation and consequent success.

New Azusa Rock Wool Plant Producing at Capacity

Manning Brothers' gravel pit in Baldwin Park, Calif., will furnish the basic material for the new A-Z plant in that city. The new industry, owned by Glenn Hansen of Los Angeles, will manufacture insulating rock wool for homes and commercial use.

The plant will be operated on a 24-hour-a-day schedule, under the supervision of Robert Folsom. Present plans call for the production of 12,000 square feet of insulating material per day, which will furnish enough for ten homes.

Spirited Discussions Mark Well Attended Sessions Of California Associations

Approximately 80 members gathered at the St. Francis Hotel in San Francisco on July 14 for a joint meeting of the Rock, Sand and Gravel Producers Association of Northern California, and the newly organized Northern California Ready Mixed Concrete and Materials Association.

Interest ran so high in the open forum discussion on the Taft-Hartley bill, that Vincent P. Ahearn, executive secretary of the National Sand and Gravel and National Ready Mixed Concrete Associations was on his feet for more than four hours.

Vanderbilt Concern to Build Talc Plant in New York

The R. T. Vanderbilt Company of New York, N. Y., which recently acquired talc mineral rights from the McLear property near Balmat, N. Y., has announced plans to begin the construction of a talc mill there early next year. It is expected that the plant will be completed by August, 1948. The mill will have a capacity of 250 tons per day.

It is reported that the talc deposits, which are located in Lawrence County, have been known since pre-Revolution days and that they are among the most extensive in the world.

The talc will be ground to a fineness acceptable to paint manufacturers for use without further grinding. It is proposed to erect the mill at the site of a shaft which the firm will have dug within a few months. The venture marks the Vanderbilt company's initial operation in the talc field in this area.

"Dantore"—Sand Substitute—Presented by Oregon Firm

"Dantore," a substance composed of perlite, will be marketed soon by Dant & Russel of St. Helens, Ore., as a substitute for sand in plaster. The new material weighs only 12 lb. per cu. ft., while sand weighs 85 lb. Its use is said to save seven tons of weight in the construction of an ordinary house.

Dantore is made from perlite ore, a volcanic substance which, when subjected to intense heat, turns into a sponge-like material composed of small glass bubbles. It is reportedly more "flexible" than sand and offers better insulation qualities.

Report on Mine Explosion Shows Value of Rock Dusting

An investigation conducted by the U. S. Bureau of Mines at the Old Ben Coal Corporation's No. 8 mine at West Frankfort, Ill., revealed some interesting facts. It was stated in a preliminary report that the disaster of July 24 was caused by an ignition of methane by an electric locomotive.

Of particular interest to those engaged in the nonmetallic mineral industries is the statement of the investigators that the explosion was confined to a small area of the mine largely because contiguous areas had been freshly rock dusted.

Dr. R. R. Sayers Resigns As Mines Bureau Director

On July 13 President Truman accepted the resignation of Dr. R. R. Sayers, who had served since 1940 as director of the U.S. Bureau of Mines. He has returned to his former work with the U. S. Public Health Service.

Dr. R. R. Sayers

At present Dr. Sayers is on leave of absence from the Health Service and is chairman of the Medical Board established by the UMWA Welfare and Retirement Fund, to serve the bituminous coal industry.

More Sand Company Observes 20th Anniversary of Founding

Twenty years ago the More Sand Company of Junction City, Kan., began operations under the management of its founder, Roy More. Since the time of its organization the crushing plant has been moved several times, but it is now located on Mr. More's own land, where a supply is assured for an indefinite period.

Today the firm furnishes eight grades of sand. A recent contract filled by More was a shipment of 35 tons of sand for highway surfacing.

The Freeport Sulphur Company, Grand Ecaille, La., has announced that it will spend $4,900,000 on the expansion and improvement of its plant.

National Safety Council Issues New Bulletin on Jackhammer Operation

Jackhammer operation is one of the principal sources of accidental injuries in quarries, according to a recent Industrial Data Sheet issued by the National Safety Council.

The publication, entitled *Jackhammers in Quarries,* points out that because work conditions make the operator's job especially hazardous, and because accidents may happen in drilling, special attention should be given to eliminating physical hazards, furnishing safe equipment and training operators in safe practices.

Although improvements in quarry and primary blasting methods often reduce the need for secondary blasting and therefore remove many of the causes of accidents to jackhammer operators, the use of the bench method in quarries having high faces, delayed blasting and the drop ball method will make quarry operations still more safe.

Operators should be provided with suitable equipment, the data sheet goes on to say, and the machines should be kept in good condition, with the steel sharpened and tempered in accordance with the manufacturers' instructions.

The data sheet lists seven ways that jackhammer operators can insure safety while on the job:

1. Wear safety shoes, goggles, and a hard hat.
2. Inspect the machine and equipment regularly, especially drill steel. Never use defective equipment.
3. Thoroughly examine the slope and face for loose rock.
4. Watch footing when climbing, getting on and off rocks and drilling.
5. Before drilling, examine the rock for stability, misfires and the safest working position.
6. Keep a good grip, drill with feet apart, and collar holes at low speed.
7. Observe all precautions in blasting. Take shelter.

Copies of the data sheet may be obtained by writing to the National Safety Council, 20 North Wacker Drive, Chicago 6, Ill. Prices for single copies or quantity lots will be furnished by the council.

New Equipment Will Double Cementos Anahuac Output

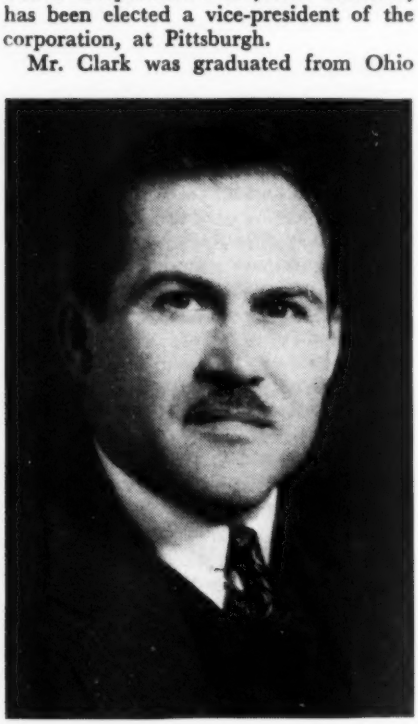
At Cementos Anahuac, S. A., Barrientos, Edo. de Mexico has placed orders for equipment which will double the capacity of the present plant. An 8- by 150-ft. kiln and an 8- by 22-ft. integral-gear-drive mill are on order from the Kennedy-Van Saun Engineering and Mfg. Corp. of New York City.

A cooler and a pneumatic transport system will be furnished by the Fuller Company, Catasauqua, Pa.; and new crushing equipment will be secured from the Iowa Manufacturing Company, Cedar Rapids, Ia. These facilities have been ordered through Salcedo, S. A., Mexican representatives for these firms.

William E. Clark Named To Executive Post by Dravo Corporation

William E. Clark, general manager of Dravo Corporation's Keystone Division, has been elected a vice-president of the corporation, at Pittsburgh.

Mr. Clark was graduated from Ohio



William E. Clark

State University in 1921. After three years with an American firm in Mexico, Mr. Clark joined the Lehigh Portland Cement Co., and was manager of its Pittsburgh office until 1930, when he was appointed assistant to the manager of the Keystone Sand and Supply Co., Pittsburgh, one of the pioneer Dravo companies.

In 1937 Mr. Clark became president of Miller and Coulson Co., Pittsburgh wholesale construction materials firm. He later acquired control of the company and operated it as the W. E. Clark Co., which was merged with the Keystone Division in 1945.

Mr. Clark was appointed assistant to the vice-president of Dravo's Wilmington, Del., shipyard in 1942, and in 1944 was appointed administrative manager. On June 1, 1945, he was transferred to Pittsburgh as general manager of the Keystone Division, and in 1946 he was elected a member of the board of directors of the corporation.

Indiana Limestone Company Reports Record Earnings

The Indiana Limestone Co., Bedford, Ind., has reported that its sales volume for the first seven months of 1947 are larger than for any full year since the early 1930's. The company, largest producer of Indiana limestone, grossed $1,800,000—as much as for the entire year of 1946.

This good showing by the Indiana company is attributed to the general upturn in the limestone industry occasioned by the gradual smoothing out of postwar troubles. The company was reorganized twice in the last two decades—once in the early 1930 depression years, and again in 1945, because of unfavorable conditions for the limestone industry.

Cementos del Pacifico, S. A. To Install New Equipment

At the plant of Cementos del Pacifico, S. A., Marmol, Sin., north of Mazatlan, Mexico, equipment has been ordered to increase the present capacity from 120 to 250 tons per day.

Officials expect that the following equipment will be installed and in operation by the end of this year: a rotary kiln, 8- by 50-ft., a rotary cooler; a 7- by 22-ft. integral-gear-drive mill; and accessory equipment. All of these will be furnished by the Kennedy-Van Saun Engineering and Manufacturing Company of New York. Senor Ramon Salcido is president of Cementos del Pacifico.

New Suspension-Flume Built By Warner Co. at Bellefonte

At the No. 2 shaft at Warner Company's Bellefonte (Pa.) plant, a flume, built into a suspension bridge, was recently completed to carry off water from Valley View Mountain into Buffalo Run. Without such a flume, the water would run down to the quarry floor, eventually seeping into the mine.

The flume-bridge was constructed in two months, the greater part of which was required for cutting a road to the construction site, so that materials could be brought in. Hanging the cables and cutting away the old flume took only four days. (The 142-ft. span replaces a 20-year-old flume installed by the Chemical Lime Company when this firm operated the plant.)

The cables which hold the trough can support a load of over 200 tons. Seventy steel hangers, varying in size, hold the troughing in place.

Universal Atlas Plant At Hannibal, Missouri Holds Safety Picnic

On August 16, 1947, the Hannibal plant of Universal Atlas Cement Company, a United States Steel Corporation subsidiary, held a safety picnic. The Safety Trophy was re-awarded to the plant by the Portland Cement Association for operating without a lost-time accident during the calendar year of 1946. This is the third such award for the Hannibal plant, which won the Safety Trophy previously in 1935 and 1939.

The accident-free year of 1946, for which the Safety Trophy is being rededicated, was part of a perfect record which extended from December 13, 1945, to April 9, 1947, or a total of 481 days without a lost-time injury. During this period, a plant safety record of 1,026,705 man-hours of accident-free operation was established. The outstanding department in safety performance at Hannibal plant is the power department. This group is daily adding to its record of more than 8,000 days, or more than 21 years of accident-free performance.

In the National Safety Competition of 1946, conducted by the U. S. Bureau of Mines, both the Hannibal quarry and mine were recently awarded a Certificate of Honorable Mention for working, respectively, 110,828 man-hours and 52,160 man-hours without a lost-time injury in 1946.

R. D. Mayne is plant manager and C. F. Colley is in charge of safety at the cement plant. The company safety work is under the direction of Gordon C. Huth, manager of industrial relations, and John E. Carlson, manager of safety and compensation.

W. C. McCall, surviving partner of The Richland Lime Company of Pulaski, Tenn., recently became sole owner of the firm's extensive holdings for a purchase price of $80,000 at an auction sale held in that city.

• The new suspension-flume at Bellefonte.

U. S. Bureau of Mines Issues Final Figures of 1946 Sand-Gravel Output

The production of sand and gravel in 1946 as reported to the U. S. Bureau of Mines, reached 254,131,000 short tons valued at $171,386,000, an increase of 30 percent in quantity and 33 percent in value over the 195,524,000 tons, valued at $128,837,000 reported in 1945. Approximately 76 percent of the output was supplied by commercial plants and 24 percent by federal, state, county, and municipal governments. The largest increases were reported for sand and gravel utilized in building, which reflects the great expansion of the construction industry.

Sales by commercial producers in 1946 were 192,092,566 short tons, increasing 26 percent over the 152,138,298 tons produced in 1945.

California, in 1946, as in the previous year, was the largest producer and Illinois, Michigan, Wisconsin, Ohio, New York, Texas, Minnesota, and Pennsylvania follow in that order. These nine states, each with an output of more than 10,000,000 tons, accounted for 52 percent of the total production.

Sales in 1946 of all kinds of sands by commercial operators, (with the exception of molding, fire or furnace, and railroad ballast,) also increased. The combined in 1945; sales of gravel by this class of operators, (with the exception of railroad ballast,) also increased. The combined total of sand and gravel used on government-and-contractor operations also shows an increase in 1946. The upward trend was due to expansion of gravel output. (The quantity of sand utilized was 15 percent below that reported in 1945.)

The total output of the industrial sands in 1946 was slightly greater than in 1945. As industrial production is expected to continue at a high level for a number of years, the outlook for the industrial sands is good.

Glass Sand. Sales of glass sand reached 4,848,602 tons with an average value of $1.97 a ton, an increase of 4 percent over the 1945 figure. Leading producing states in the order named were Illinois, West Virginia, Pennsylvania, Missouri, and California.

Molding sand. The output of molding sand was 6,973,906 tons, a decrease of 3 percent. The average value was $1.37 per ton. New Jersey, Michigan, Illinois, Ohio, and Indiana were the leading producers.

Grinding and polishing sand (including blast sand). Sales of this sand increased 41 percent reaching 906,889 tons and averaging $1.52 per ton. States leading in production were Pennsylvania, Michigan, Illinois, Missouri, and New Jersey.

Fire or furnace sand. Decreasing approximately 20 percent in tonnage, sales were 248,866 tons, averaging $1.34 per ton. The largest output by states was from Indiana, Ohio, New Jersey, Pennsylvania and Illinois.

Engine sand. Sales of engine sand increased 1 percent and reached 2,797,132 tons, averaging 69 cents per ton. West Virginia, Pennsylvania, Illinois, Indiana, and Kentucky led in production.

Filter sand. Production of filter sand increased 43 percent to 157,511 tons, with an average value of $1.81 per ton. States leading in production were New Jersey, New York, Connecticut, Massachusetts and Iowa.

Preparation. Washed, screened, or otherwise prepared sand and gravel comprised 91 percent (174,195,542 tons) of the total commercial production; average value was 80 cents a ton, as compared with 50 cents for unprepared material.

Transportation. Of the total commercial output, 51 percent was shipped by truck, 40 percent by railroad, and 9 percent by waterway. When government-and contractor output, which is commonly moved by truck, is added, the percentages become respectively 64, 29, and 7.

Output of sand and gravel from noncommercial or government-and-contractor operations in 1946 accounted for 24 percent of the total tonnage as compared with 22 percent in 1945. The value of this tonnage in 1946 as in 1945 represents 14 percent of the total for the industry. The increase in quantity is attributed largely to the expansion of the government program to improve existing roads and build new highways. States reported 50 percent of the total in 1946, counties 42, municipalities 2, and other agencies 6.

Division of Permanente Builds Soda Ash Plant At Owens Lake, Calif.

Work on a soda ash plant was rushed to completion at Owens Lake, Calif., for the Kaiser Aluminum Division of Permanente Metals Corporation. Estimated capacity is 100 tons of the material daily. The project was made a rush order because of the shortage of soda ash.

Output of the plant will be absorbed by Permanente's Baton Rouge, La., works, where it will be used to convert bauxite into alumina.

Third Annual N.A.L.A. Meeting Set for January 14, 15, 1948

At the last meeting of the Board of directors of the National Agricultural Limestone Association it was decided to schedule the next annual meeting of the association for January 14 and 15, 1948.

The sessions will be held at the Hotel Statler in Washington, D. C. This meeting will be the third annual gathering of the association.

Operation of the Arkansas Aglime Company's plant at Mt. Ida, Ark., was scheduled to begin the first week in August.

"Danger for the Fun of It"

By A. LUNDTEIGEN, JR.

The principles of safety and accident prevention are universally accepted as being wholly beneficial. It would be difficult indeed to find anyone who would not agree that it is wise and right to take precautions against personal injury with all its attendent suffering and economic loss.

It is sometimes difficult to understand, therefore, why men persist in doing things which are known to be hazardous. Of course, much unsafe practice can be accounted for by failure to think of possible consequences, or simply because of ignorance of the dangers involved. Too many times, however, it is apparent that a man has deliberately, with full knowledge of potential risk, chosen an unsafe way of doing something that could just as well have been done safely. Why? I think it is because men have never completely outgrown the craving for adventure that impels small boys to climb to the highest branch of a tree or to walk on the top of a high board fence rather than on the sidewalk which parallels it.

A. Lundteigen Jr., superintendent and chemical engineer, Ash Grove Lime & Portland Cement Co., Louisville, Neb.

There is a pleasureable thrill in pitting ones strength and skill against recognized hazards which is only partially reduced by the mature judgement and physical limitations of passing years. It is the same as the vicarious thrill enjoyed by spectators of all ages at exhibitions of daring such as automobile stunt driving and the several types of dare-devil stunts common to county fairs and carnivals.

Probably the most common evidence of indulgence in danger for the "fun of it" is seen on the highways. How else can we account for so much recklessness among people who are well aware of the risks they run?

Probably the only corrective or preventive measure applicable to cases of this kind is education. Possibly a realization that many of the chances we take are motivated by childish desire for adventure would help to overcome our natural inclination to accept the challenge presented by danger.

U. S. Bureau of Standards Establishes New Division Of Building Technology

A new Division of Building Technology has been established at the National Bureau of Standards, according to an announcement by Dr. E. U. Condon, director of the bureau.

The nucleus of the new division consists of five sections: structural engineering; fire protection; heating, ventilating and air conditioning; exterior and interior coverings; and codes and specifications. The structural engineering section will deal with the strength, stability, and stiffness of buildings and the structural elements of buildings. The fire protection section will continue its work on fire resistance of building construction, the fire hazard of building contents and fire detecting and extinguishing equipment. Heating, ventilating and air conditioning systems and heat transfer through materials and constructions will be the responsibility of the heating and air conditioning section. The exterior and interior coverings section will handle the following: roofing and waterproofing; floor, wall and ceiling finishes for buildings; and in general the chemical and physical properties of bitumens. The codes and specifications section will carry on work formerly performed in another division on building, plumbing and safety codes and standards, building fixtures and service equipment and construction and maintenance practices.

While much of the work to be carried on will be primarily for the benefit of other governmental agencies, the results should be useful to the entire construction industry and it is intended that they shall be made available for the purpose. In addition, research problems of interest to the industry as a whole, particularly where no other research facilities are available, will be undertaken by the new division.

Demand Exceeds Output At Natl. Gypsum Plants Despite Capacity Output

All National Gypsum Company plants are operating six days a week, but the demand is "in excess of capacity," said President Melvin H. Baker. "We haven't felt any softening in the market for our products," Mr. Baker added. "Sales are running at a record rate and about 40 percent ahead of a year ago only because of the new capacity. As long as the country builds 700,000 new homes a year, we will continue to utilize our facilities at capacity."

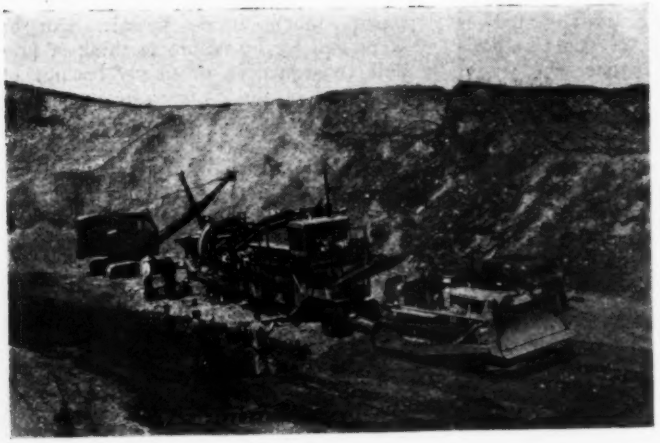
Mr. Baker believes that costs in the building field may go higher. "We are faced with an advance in fuel prices, freight rates and increased steel prices," Mr. Baker said. "These would indicate that any move made would be upward."

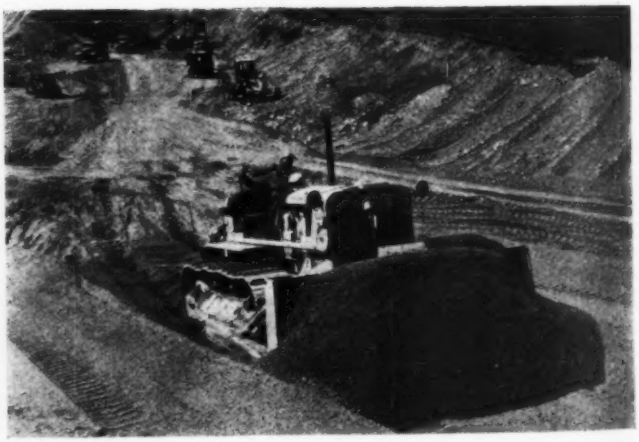
According to *Limeographs* for July 15, 1947, the city of Austin, Tex., has used hydrated lime for the last four years to stabilize the base in rebuilding several sections of its streets.

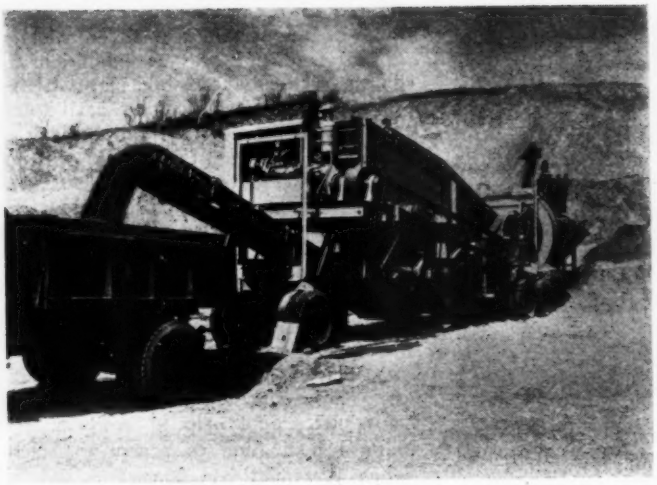
• The accompanying photographs show typical jobs performed at the scene of the J. W. Craig Company's operation near Osseo, Minn. At the left a "Caterpillar" diesel D7 tractor, equipped with "Caterpillar" cable control and No. 7S bulldozer, is stockpiling gravel.

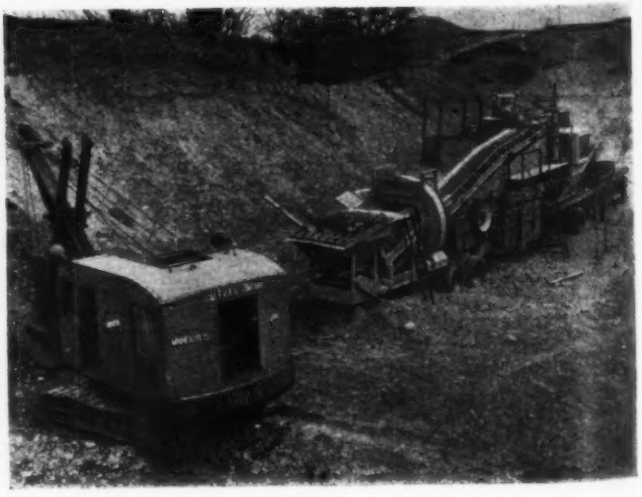
• A jack-of-all trades, the D7 also moves the crusher to locations, strips overburden, builds truck haul roads and dozes gravel down to the shovel (middle set).

• The two lower pictures show a Link-Belt speeder shovel with a ¾-cu.-yd. bucket and powered with a "Caterpillar" diesel D4600 engine handling as much as 150 cu. yds. per hour. A "Cat" diesel D8800 engine drives the new universal unicrusher with both primary and secondary units combined in one machine.









Explosives Control Act Of World War II Suspended By Eightieth Congress

Federal explosives controls which governed the manufacture, sale, possession, storage and use of nonmilitary explosives during World War II were officially terminated on July 25 when President Truman signed legislation suspending the operation of the Federal Explosives Act.

Enactment of Public Law 239 by the Eightieth Congress brought to an end more than five years of government administration of the Federal Explosives Act — a major security measure following the declaration of war by the United States on December 8, 1941.

Administered by the Explosives Control Division of the Bureau of Mines, the Act was designed primarily to prevent the use of explosives for sabotage. Although millions of pounds of explosives were consumed by American industry during the war, not one clear-cut case of sabotage involving blasting materials was reported to the bureau—striking evidence of the effective administration of the statute.

The successful control of the heavy consumption of nonmilitary explosives was achieved by licensing makers and users of explosives and checking compliance through a small staff of explosives investigators working under the direction of existing district offices of the bureau's Health and Safety Branch and in cooperation with various other agencies. During the operation of federal explosives controls, more than 800,000 licenses were issued or reissued in the United States and its territorial possessions by a corps of approximately 4,200 volunteer licensing agents serving without federal compensation.

Placed in effect during 1917 as a war measure and revised on December 26, 1941, after becoming automatically operative upon the declaration of war, the Federal Explosives Act provided heavy penalties for violation of numerous statutory provisions or of any rules promulgated by the director of the bureau with approval of the Secretary of the Interior.

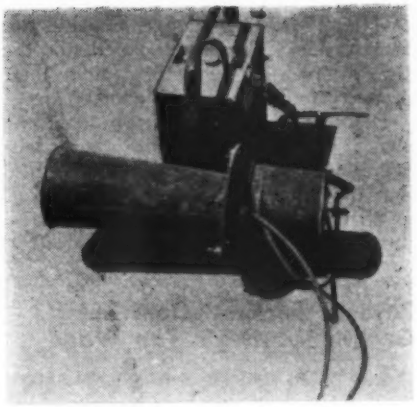
Johns-Manville Sales Climb In Second Quarter of 1947

Sales of the Johns-Manville Corporation in the second quarter of this year, amounting to $33,613,580, were the largest for any three-month period in the history of the company. Last year, in the comparable period, sales were reported at $22,501,030.

Net profit for the April-June quarter was $2,938,645, which amounts to $1.01 per share on outstanding common stock after the three-for-one split effected on May 12. This compares favorably with the net profit of $1,738,101 recorded for the second quarter of 1946.

Safety Appliance at Plant Blows Its Own Horn

A home-made safety device developed by C. W. Cosby, a master mechanic at the Crestmore plant of the Riverside Cement Company, Riverside, Calif., is a portable battery-driven horn used to warn persons when railroad cars are dropped within the plant.



• Portable safety horn signals approach of railroad cars.

The device is made of a motorcycle battery and an automobile horn. A sheet-steel case is fitted with hooks, so that the horn can be fastened to the front of the car. It weighs about 20 pounds.

100,000 Genl. Portland Shares Reported Available

Lazard Freres & Company, Chicago, Ill., have issued a prospectus offering 100,000 shares of General Portland Cement Company common stock, price $16.75 per share. The announcement in current newspapers states that the information appears "as a matter of record only, and is neither an offer to sell nor a solicitation of offers to buy, any of this stock."

The items also states that this block is not a new issue, and that "the offering is made only by means of the prospectus."

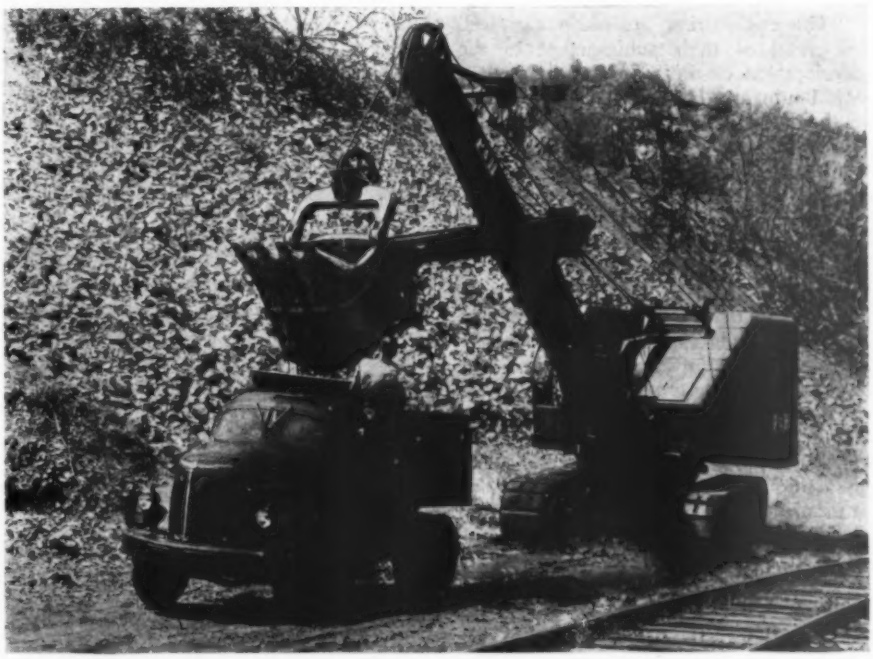
2nd Annual Short Course Of N. S. & G. Association Scheduled for November

Tentative arrangements have been made to hold a second Short Course of Instruction for Sand and Gravel Technicians at the University of Maryland November 17 through 22. This year's short course for their members will be sponsored jointly by the National Sand and Gravel Assn. and the National Ready Mixed Concrete Assn., together with the University of Maryland.

The instruction will be restricted to discussions of the problems involved in the design of concrete mixtures. This means that the curriculum will be of narrower scope, which will permit more intensive and detailed instruction than was possible last year, when the broad aim of the course permitted only the covering of the high points. It is the tentative policy, adopted by the boards of both associations, that both types of courses will be held in alternate years.

Instruction in 1946 consisted of lectures and laboratory demonstrations, but such a procedure is feasible only when the number of students is limited to about 40. With a larger number, only lectures can be given, and accordingly, the decision as to the nature of this year's course will not be made until the associations have more exact information as to the number expected to be in attendance. Classes will be held at College Park, Md.

The Morton Salt Company has purchased the Myles Salt and Bay Chemicals Companies, at Week Island in Iberia Parish, La. The plants will continue in capacity operation.



• This 2-cu.-yd. P & H shovel, driven by a 165-hp., 6-cylinder General Motors diesel engine is doing high-volume producing for the Triangle Stone Company's huge crushing plant on Ladds Hill near Cartersville, Ga. In two scoops, trucks like the one shown in the picture are on their way. W. E. Johnson, manager of the plant, states that the G. M. diesel-powered machine has moved as much as 1600 tons of chert in a single 10-hour day. The rock crusher itself has a capacity of 400 t.p.h., and geologists estimate that there is enough rock in Ladds Hill to keep a plant operating for over 100 years at this rate.

White Motor Co. Official Promises Trucks Adequate For Special Purposes

In an address delivered by J. Nevin Bauman, vice-president in charge of sales for the White Motor Company, before

—The White Motor Co.

J. Nevin Bauman

the National West Coast Transportation and Maintenance Meeting, Society of Automotive Engineers, in Los Angeles on August 21 and 22, this industrial executive promised trucks better designed to fit users' needs.

"The engineering profession can well be proud of their achievement in the development of the motor truck," stated Mr. Bauman. "However, the completion of the engineering cycle—which also takes responsibility for the most efficient use of its invention—has not been applied as well to motor trucks as it has to other industries. We still find that the large proportion of motor truck installations are based on practically no consideration of the requirements of the work that is to be done so that the motor truck can be accurately fitted to the job. All too often the only basis for truck application is a request for a two-ton truck or a four-ton truck without any further consideration as to a careful engineering analysis of how well the component units and all of the optional items in the way of power, transmission and axle are geared to fit the job."

Gregg Operation at Roscoe To Continue Despite Protest

Despite the efforts of 28 residents of Roscoe, Calif., to obtain an injunction restraining the John D. Gregg Company from continuing its operation in that city, Superior Judge Alfred L. Bartlett stated that since the Los Angeles city council had permitted the firm to carry on excavation, Mr. Gregg's license could not be set aside. The protest stated that the Gregg operation was damaging their property to the extent of $350,000.

However, Judge Bartlett ordered the owner to honor a promise that night operations would be discontinued, also that the dragline would be wetted down at all times and that dust eliminators be installed to reduce the dust nuisance.

Potash Workers' Contract Grants Industry's Top Wage

Under the terms of a new wage agreement secured by the C.I.O. Mine, Mill and Smelter Workers Union for 2,000 employees of the International Minerals and Chemical Corp., the Potash Company of America and the United States Potash Corp., these Carlsbad, N. M., potash workers are now among the highest paid in any country. They receive basic hourly pay of $1.64 under the new agreement.

The three companies produce approximately 90 percent of the potash processed in the United States.

Illinois Firm Wins Air Rights In Deal with City Fathers

At Alton, Ill., the city council recently passed an ordinance premitting the Mississippi Lime Company to lease overhead space over a county road. The 99-year lease will make possible the construction of a sand conveyor connecting the company's tipple and its storage yards across the highway.

In return the firm will cooperate with the city and "other interested parties" to open a right-of-way for a local parkway project. It will also enclose the conveyor.

Space reservations are being made for the 21st Exposition of Chemical Industries, which will be held December 1 to 6 at the Grand Central Palace, New York, N. Y., indicate that fourth floor of the building will be filled for the show.

200 Sessions Planned For 35th Safety Congress At Chicago, Oct. 6-10

Nearly 10,000 safety-minded people from all corners of the United States and other parts of the world will meet in Chicago for five days from October 6 through 10 for the 35th National Safety Congress and Exposition.

Programs for more than 200 sessions on all phases of safety have been planned, and four large Chicago hotels have been engaged to house the delegates and their activities. Congress sessions on industrial safety will be held at the Stevens, Congress and Palmer House hotels, while public safety sessions will take place at the Sherman hotel. In addition, public safety displays and motion pictures will be held at the Sherman, and industrial safety exhibits and films will be presented at the Stevens hotel.

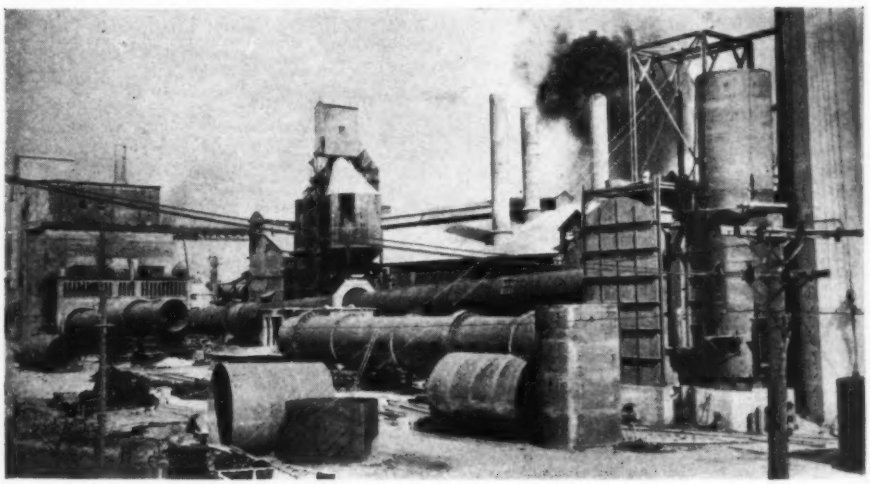
Among the headliners at the Congress will be John Sterling, publisher of *This Week* magazine: Dr. Ralph W. Sockman, minister of New York City's Christ Church and Paul G. Hoffman, president of the Studebaker Corporation.

$50,000 Modernization Plans Revealed by Marin Gravel Co.

The Marin Gravel Company's plant at Point Reyes, Calif., is soon to be remodeled and expanded to the extent of approximately $50,000, according to an announcement made recently by H. C. Phillips, owner and operator.

Among the improvements will be a new rock crushing plant which will meet the specifications of the California State Road Department. (State requirements now call for a large percentage of crushed rock to be included with gravel.) The company has also ordered four new 5-cu.-yd. dump trucks and other equipment.

The Rightsell Calcium Company's plant at Greencastle, Ind., including the building and a tract of land, was recently purchased by the Midwest Rock Products Company of Toledo, O.



• A large refractory kiln is under construction at the Maple Grove, O., plant of Basic Refractories, Inc., of Cleveland. The massive circular steel sections in the foreground are parts of a 125-foot stack that will be 12 ft. 6 in. in diameter. In the center is the company's Number 10 kiln.

N.S.G.A. Issues Bulletin And Map Featuring U.S. Superhighway System

The National Sand and Gravel Association, through its executive secretary, Vincent P. Ahearn, has issued to member companies the map shown on this page, accompanied by the following announcement:

"The attached map shows routes finally approved by the Federal Works Administrator, General Philip Fleming, for inclusion in the national system of interstate highways. The new interstate system was mapped by the State Highway Departments in cooperation with the Public Roads Administration. It comprises the most heavily-traveled highways in the federal-aid system, and includes extensions of the system through urban areas.

"The integrated system consists of north-and-south, east-and-west, and diagonal routes that will make it possible to travel from any section of the country to any other section by a direct route.

"The system contains 37,681 miles of the nation's principal highways, including 2,882 miles of urban thoroughfares. Additional urban circumferential and distributing routes are to be designated later, and 2,319 miles have been reserved for these routes. The system will serve 42 state capitals and 182 of our 199 cities of more than 50,000 population.

"The approved map shows the general location of all routes. Principal cities to be connected are indicated but details of the exact location are left for determination as construction projects are planned.

"Rural sections of the interstate system comprise only 1.1 percent of all rural roads but carry 20 percent of all rural traffic. Average traffic on routes comprising the system, exclusive of urban sections, was 2,693 vehicles per day in 1941, as compared with 1,439 on the federal-aid system, 972 on state highways and 155 on all rural roads.

"In many large cities depressed or elevated expressways will be built, making possible city travel at an average of 35 to 45 miles an hour, without stops for traffic signals and free of interference by cross-traffic. Depressed portions of expressways will be supplemented by parallel frontage roads for local traffic, and bridges will be constructed at intersections to serve cross-traffic. The urban expressways will be integral parts of the national interstate system.

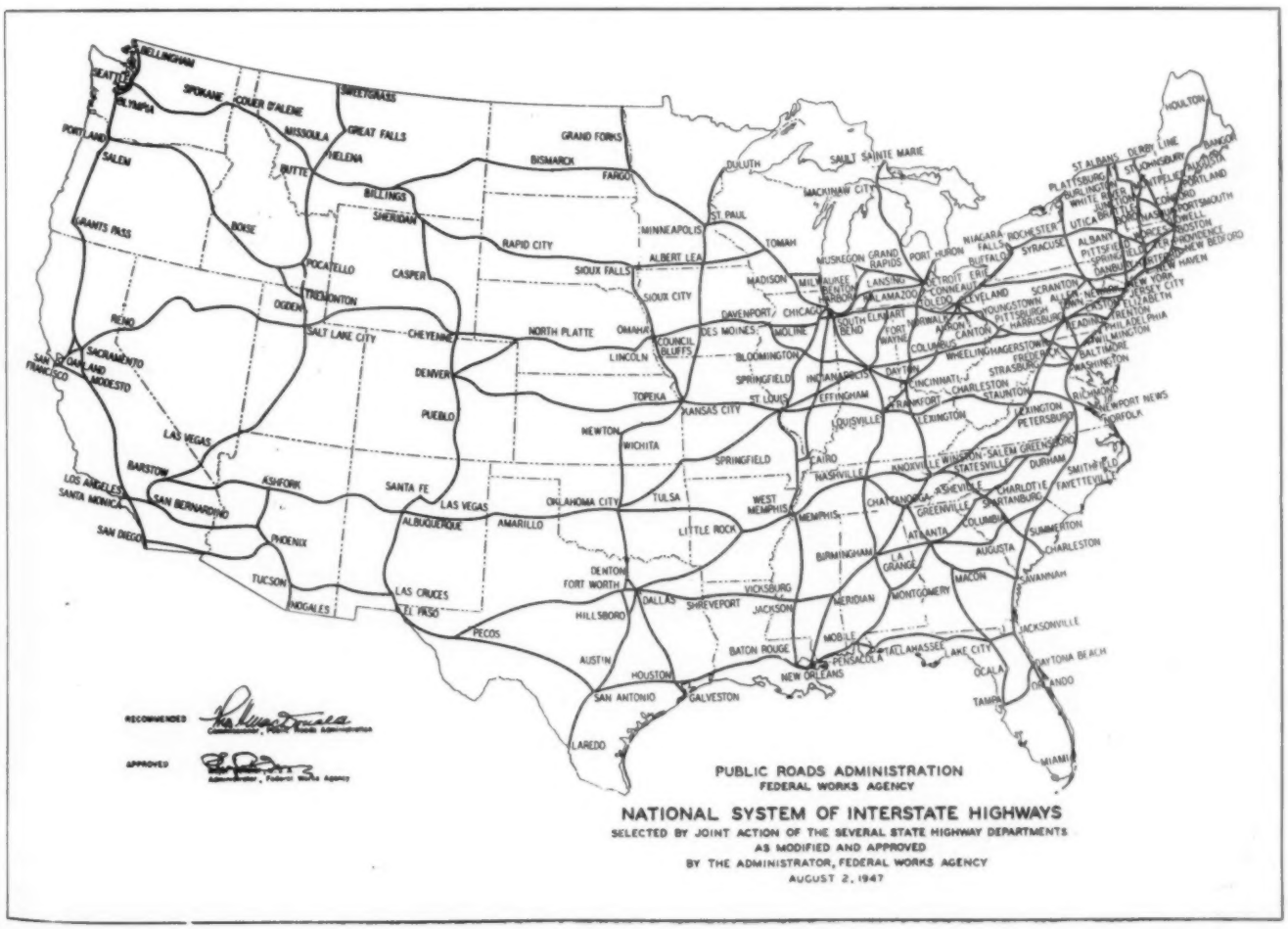
"The Federal-aid Highway Act of 1944 authorized $500,000,000 in each of the three fiscal years following the war to assist the states in developing a three billion-dollar highway program which would include improvements on the regular federal-aid system, on highways in urban areas where the population is 5,000 or more, and on a federal-aid system of secondary or farm-to-market roads in each state.

"The sum of $225,000,000 was set aside from the authorized annual appropriation for improvements on highways in the regular federal-aid system; $125,000,000 was made available for urban sections of the system only, including expressways, circumferential and distribution routes; and $150,000,000 was earmarked for state systems of secondary roads.

"No specific sum was provided for development of the national interstate system; however, since the system is made a part of the federal-aid system, the amounts provided for this system are available for the interstate system. The appropriations authorized have already been apportioned among the states.

"In most states half of the cost of federal-aid projects and up to one-third of the cost of right-of-way may be financed by the federal government. The exceptions are states containing large areas of land in the public domain where a higher rate of federal participation is permitted. . . .

"President Truman approved the Independent Offices appropriation bill containing a $247,711,146 item for carrying out the provisions of the Federal-Aid Highway Act of 1944 during the 1948 fiscal year. This sum is a part of the $500,000,000 authorized for the first postwar year. Since the amount previously appropriated under the act for the fiscal years of 1946 and 1947 was $175,000,000, Congress has found it necessary to appropriate a total of only $422,711,146 thus far, less than one-third of the $1,500,000,000, in federal highway aid authorized in the 1944 law."


RECOMMENDED
APPROVED
PUBLIC ROADS ADMINISTRATION
FEDERAL WORKS AGENCY
NATIONAL SYSTEM OF INTERSTATE HIGHWAYS
SELECTED BY JOINT ACTION OF THE SEVERAL STATE HIGHWAY DEPARTMENTS
AS MODIFIED AND APPROVED
BY THE ADMINISTRATOR, FEDERAL WORKS AGENCY
AUGUST 2, 1947

WASHINGTON NEWS LETTER

another P AND Q exclusive

IT is difficult to say whether economic developments at home or abroad are the cause of greater concern to government officials these days. The undisputed leader on the list of domestic headaches is, of course, the unabating pressure of high prices on consumer incomes. The special congressional investigation of the mounting cost of living has thus far been about as fruitless as was generally expected. It requires no highly-publicized set of hearings to determine that prices have moved steadily forward since controls were abandoned last year. And while the grumbling of housewives over the shrunken buying power of the family dollar is recognized as a political factor of the first importance, especially with a presidential election not far off, the practical obstacles to a reimposition of price controls are so overwhelming that no responsible official counts on help from that direction.

Pressing most heavily on consumer pocketbooks is the high cost of food. The level of food prices today is about 100 percent above the pre-war period. It is true, as is often pointed out, that the record level of national income, and the demands of many consumers for a better diet than before the war, have much to do with keeping prices high. But comparisons of this kind, based on the nation as a whole, are misleading with respect to how individual groups are faring.

A recent staff report prepared for the Joint Economic Committee investigating the cost of living makes this point clearly:

"While the high prices of food may be generally explained by high levels of current income and consumption, the effects are shared unevenly by the population. For many people, incomes have not kept pace with rising food costs.

"This is particularly true among lowest-income families and such salaried groups as teachers, nurses, office workers and those living on retirement and other pensions or fixed annuities from trust funds and insurance policies.

"For many of these people, the high cost of food has become a problem for which average statistics on the relationship between prices and income give small comfort."

In appraising the outlook for food prices in the months ahead, this report, after observing that aggregate farm output this year will be just as great as last, fixes on two factors as having especial importance. The first of these is the relatively low corn crop in prospect. Since corn normally bulks so large in the supply of animal feeds, there will be an unusual drain on the record-breaking wheat crop for this purpose. Aside from the implications of this shift for meat prices, there is a serious question as to what effect this would have on the availability of wheat for foreign aid. U. S. wheat shipments have been the mainstay of the diet, inadequate as it is, under which many foreign countries, especially in Europe, have been living. This brings up the second factor affecting the price outlook—how large a program of aid will develop under the Marshall plan, and what its effect will be on domestic prices. In this connection the report concludes that while food exports to date have contributed somewhat to price pressures, these shipments have consisted mostly of grains, in which U. S. production has been unusually high.

Though the aid program is still being worked out at this writing, it is not expected that when completed it will call for higher grain exports in the coming year than the 15,000,000 tons or so shipped last year. Because of the corn situation, however, it may not be possible to maintain this level of assistance without invoking some sort of control over the amount of wheat used for feed and for the manufacture of alcohol. Federal authority along this line no longer exists, so congressional approval would be necessary. The only other alternative is unlikely to find much popularity, and that is for consumers voluntarily to eat less. Senator Taft, an admitted presidential aspirant was injudicious enough to make this suggestion in a speech recently, but the reaction was apparently so unfavorable that the next day he insisted he was merely repeating a proposal which had originated with Mr. Truman.

Fortunately for overworked bureaucrats, the economic picture has its happier side. Though the term "prosperity" can be deceptive in times like these, at least the break which was to have led to an unpleasant business recession is not yet in evidence. Consumer demand is undoubtedly being strained by inflated prices, but the key industry in the economy—construction—seems to be holding up remarkably well.

The President's Mid-Year Economic Report, it will be remembered, warned that construction would have to continue at a vigorous pace to sustain full employment. Total new construction in 1946 was close to $10 billion. In the first half of 1947, the annual rate was almost $11 billion, and the consensus of estimates of construction economists in Washington at the present time is that new construction will be in the neighborhood of $12.5 billion annually in the second half of this year.

As for 1948, the opinion of the experts is even more optimistic. Government forecasts which are shortly to be released estimate total new construction next year at around $14 billion. Five billion of this is for residential building, and the rest for industrial, commercial, utilities, farm, and public construction. The estimate for the "non-residential" categories involve an increase of almost 20 percent over the total expected for 1947. For residential construction, the increase is about 25 percent, and is based on the assumption that consumer incomes will not decline sharply in 1948. If incomes remain high, it is expected that the dollar value of home building will continue to expand despite high costs.

This is significant if only because of the widely expressed fear that a drop in residential building caused by the extremely high level of construction costs might itself be one of the main factors contributing to a decline in incomes. Incidentally, even in the more pessimistic estimates, demand for houses is expected to continue so strong in 1948 as to make any decline in total residential building very unlikely. It goes without saying that even a total of $5 billion at current prices would fail to meet the needs of the American people for new living quarters. There has been a lot of speculation as to how much success will crown current efforts to reduce building costs, and so make new housing available to a broader market. But perhaps more so in the capital than elsewhere, there is acute, unquestioning consciousness of the basic social and economic importance of realizing that aim.

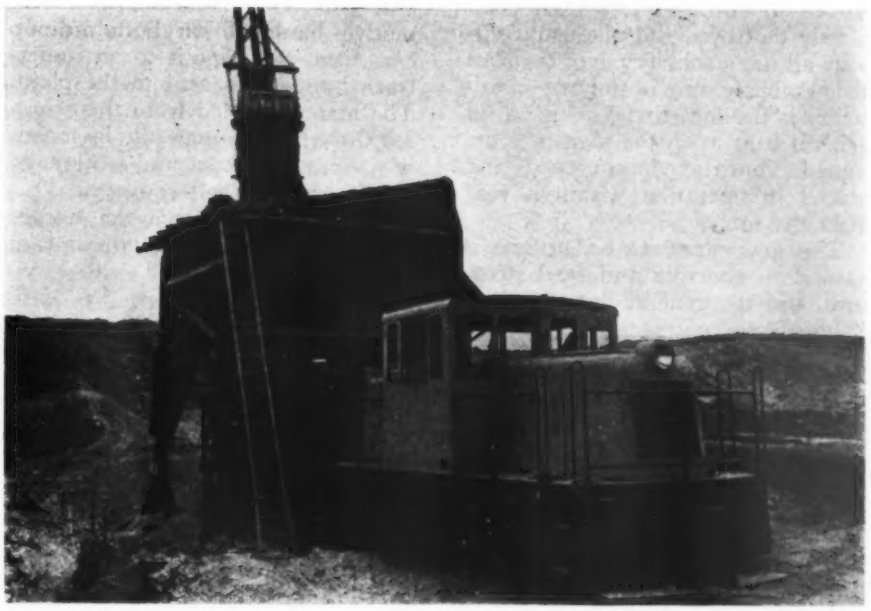
American Aggregates' New Kalamazoo Plant Now in Full Operation

another ON THE SPOT report

ALTHOUGH multiple plant operations are not by any means rare in the aggregates industry, there are relatively few companies in the buisness today which operate as many widely separated plants as the American Aggregates Corporation of Greenville, Ohio. Its 19 plants, located in Ohio, Michigan, Indiana and Illinois, make this company one of the largest producers of aggregates (including sand and gravel, crushed boulders, industrial sand and slag) in the Middle West.

As the extent of its operations would indicate, American is an alert, progressive, organization, and its plant building, expansion and modernization programs have been featured repeatedly in the pages of PIT AND QUARRY because they have invariably constituted news of first rank importance. Equipment selections, handling methods and process developments seem to us to acquire even more than their usual significance when the company concerned has, as in the case of American, multiple opportunities to test performance under a wide range of operating conditions, and can accept or reject on the basis of many parallel experiences.

Thus we were more than pleased several months ago to accept the company's cordial invitation to visit its recently-completed plant at Kala-



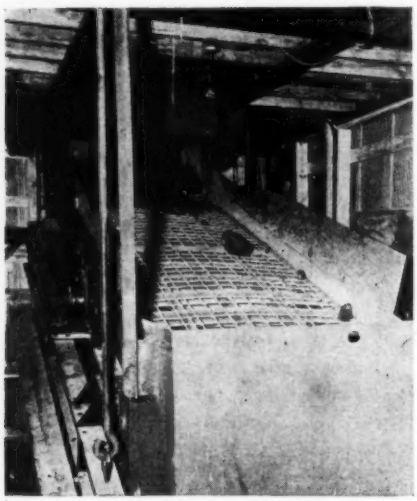
• A new diesel-electric locomotive hauls a 50-ton bottom-dump car from the pit.

• The 3,000-ton raw storage pile is fed by belt conveyor from an undertrack hopper. Note dump car unloading from the bridge at right.

• Below: General view of American Aggregates' modern plant at Kalamazoo, Mich. The plant rests on three concrete storage silos.

mazoo, Michigan. American had operated an old style direct-loading plant of timber construction at this location for a number of years. The installation was already slated for replacement when a fire, which occurred in April of last year, completely destroyed the plant and virtually all the machinery. Not the least remarkable feature of the new installation is the fact that in this era of general frustration the plant was designed, constructed, equipped and placed in operation within a year after the fire.

The new plant at Kalamazoo is a modern concrete and steel structure, and the general layout is very



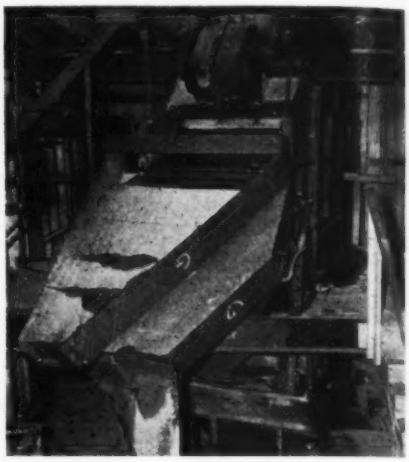
• The 3-deck vibrating screen over which the entire feed passes.

similar to a design which the company has developed and adopted at a number of locations. Washing, screening and crushing capacities are sufficient to turn out about 2,500 tons of finished product per day, including three or more sizes of crushed gravel, four or more sizes of uncrushed gravel, three sizes of sand and many blends of sizes.

The deposit runs about 50 percent minus ¼-in., with depths varying from 20 to 40 ft. and overburden averaging approximately 2 ft. A Bucyrus 50-B diesel electric dragline loads the material into a portable steel hopper straddling the standard-gauge track over which a new General Electric diesel-electric locomotive hauls 50-ton bottom-dump cars from the deposit to an under-track hopper adjacent to the plant. The material is fed from there to a 3,000-ton raw storage pile by means of a vibrating feeder and a 30-in. by 143-ft. inclined belt conveyor.

Material is fed from the storage pile to the scalping plant by means of a hopper, equipped with a vibrating feeder, a 30-in. by 55-ft. tunnel conveyor, and a 30-in. by 50-ft. section of field conveyor, the latter discharging over a 5- by 12-ft. triple-deck vibrating screen. In addition to this screen the 14- by 34-ft. steel frame scalping plant houses a gyratory crusher for primary crushing of plus 1½-in. material. All of the crushed material drops onto a 24-in. inclined belt and is elevated and discharged into a separately-housed fine reduction crusher located about midway between the scalping plant and the washing and screening plant.

The washing plant proper rests on three 25-ft. diameter by 30-ft. high poured-concrete silos. Located on a common centerline and spaced 35-ft. center-to-center, the silos act as partition walls for the various sizes of material stored on the ground adjacent to them, an arrangment which greatly simplifies the problem of handling and storing finished products. The silos themselves are used for the storage of 1/10- to



• Two double deck vibrating screens in the main screening and washing tower.

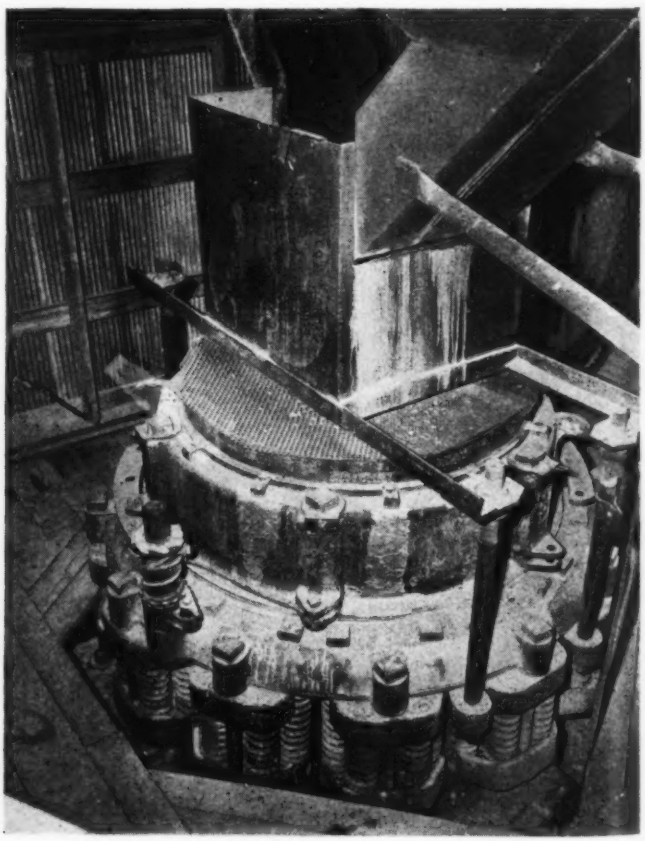
⅜-in. crushed material, ¼- to ½-in. gravel and 1/10- to 3/16-in. birdseye.

The plant is remarkable for its generous screening capacity, a point in respect to which many designers are prone to falter. There are four vibrating screens in the washing plant proper, ranging in size from 4- by 8-ft. to 5- by 12-ft. In addition there is a double-deck 4- by 8-ft.

(Continued on page 70)

• Right: The primary crusher is housed separate from the main plant.

• Below: The secondary crusher is in closed circuit with one of the screens in the washing plant.



Screenings

BY *William M. Avery*

IT seems timely at this point to pass on to our readers a gentle reminder that this department of their favorite journal was originally conceived as a participating venture rather than as a platform from which to launch monthly monologues. Although we've had sufficient response to encourage us to continue, we feel confident that the Chicago post office has not so far found it necessary to hire extra employees to handle the additional mail drifting toward 538 South Clark Street.

Letter writing, of course, is in most respects an unmitigated nuisance, and we're thoroughly in sympathy with people who abstain from the practice as much as possible; in fact, we're abstainers ourselves. But in this special instance we wish our readers (yes, that's plural!) would try a flyer into the realm of pure frivolity now and then, and send us copy suggestions. They can be hilarious, heart rending, catastrophic or mildly whimsical, just so long as they have something to do with flesh-and-blood human beings. We suggest the penny post card as an admirable substitute for the formal letter; it is not only economical, but it enforces a certain frugality in verbiage which cannot help but conserve time at both ends of the line. Contributors may remain anonymous if they so desire.

Sparkle Again

GRAVEL Gertie's offspring, Sparkle Plenty, whose birth was announced in this department several months ago, is back in the news. Some enterprising gent has brought out a Sparkle Plenty doll, and reports have it that department stores are doing a land office business, with the demand far exceeding the supply.

We suggested that perhaps PIT AND QUARRY should corner a supply and use them in place of the conventional bronze plaque for awards in the National Ready Mixed Concrete Association's safety competition, but so far nobody has shown much enthusiasm for the project. According to the description in newspaper advertisements, "She's so warm and snuggly, made of soft Magic Skin, with deep blue eyes and all that gorgeous long golden hair, you simply can't resist her!" We haven't yet seen a bronze plaque we couldn't resist.

The ads for Sparkle go on to say, "You can do her hair a million ways, brush it, braid it, sweep it up on top of her beautiful head." By our count that's only three ways, or a bit short of a million, but it's still better than you can manage with a plaque. Maybe *The American Hairdresser,* which is published by our esteemed competitors, can do something with the idea.

Agitated Bridal Party

WE thought our item in the July issue about the concrete mixer unwrapping pennies in a bank was pretty far fetched until Mr. O. Doob of H. J. O'Connell, Ltd., sent us a clipping with an actual photograph of the installation. Mr. Doob attached a note saying that he thought we were joking. As a matter of fact, we thought so, too.

Now we have another one for Mr. Doob and anyone else interested in distinctly "odd" jobs for concrete mixers. An item from Niagara Falls, N. Y., reports that a honeymoon couple arrived there in a concrete mixer. That's at least one method of keeping the groom thoroughly mixed up until the fatal knot is tied. We presume the "Cement Mixer, Puti, Puti" song was used in place of Mendelssohn's Wedding March.

Red Tide Off Tampa

PHOSPHATE plants located in the Tampa area have recently come under suspicion as being responsible for the pollution of Gulf Coast water by a strange phenomenon which Floridans call the "Red Tide." In huge, mottled patches, covering an area 60 miles long and 25

miles wide, the red-dyed water killed fish by the countless thousands, creating an unearthly stench from Gasparilla Island to Tampa Bay.

The fish were apparently killed by a new species of minute, one-celled organisms present in the "red" water, and the theory boys seem to think that the one-cellers are encouraged by an increase in the phosphate content of the water.

It all sounds pretty fishy to us. If the polluted waters were dyed green or yellow or any color in the spectrum except red, we'd be willing to go along with the phosphate theory. But definitely not as long as the plague remains red. It strains coincidence too far. If the Dyes Committee (my, how these puns pile up!) were still functioning, *they'd* know where to look for the trouble.

Bookworm's Trajectory

THE Bookworm mentioned in our last issue would obviously travel only a quarter of an inch; *i.e.*,

through the front cover of the 1946 edition and through the back cover of the 1947 edition of the HANDBOOK. That leaves the little devil facing Chicago Steel Foundry's ad on page A of the current edition. When he gets through reading about clinker coolers, conveyor buckets and pulverizer hammers, he'll undoubtedly browse on through the rest of the book.

Your book worms will *like* the covers and pages of the HANDBOOK. They're vitamin-enriched and tasty. They're—oh, to blazes with it!

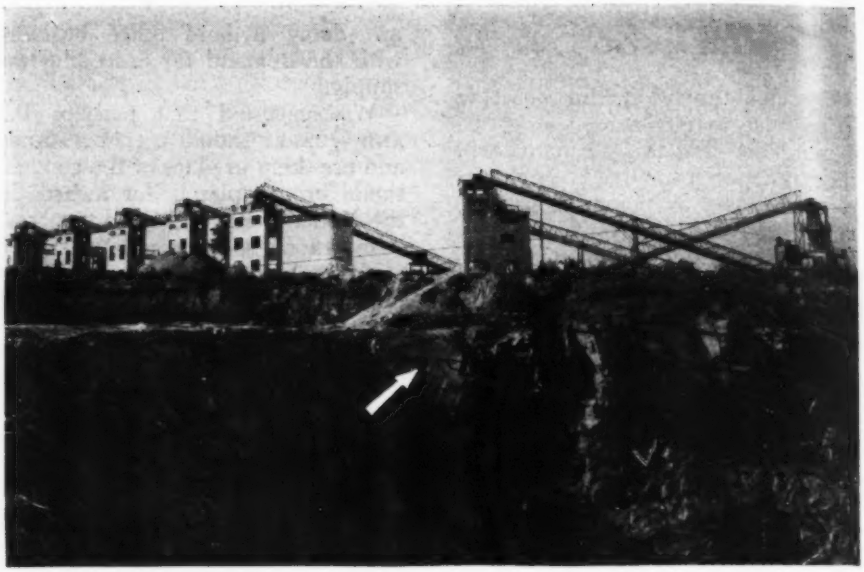
Palmetto Executes Expansion Program Envisioned in Original Plant Design

another ON THE SPOT report

AFTER five years of operation the Palmetto Quarries Company installation at Columbia, South Carolina, still rates in anyone's book as one of the finest crushing plants in the stone industry. Originally designed for an output of 150 t.p.h. (less screenings) a number of changes (most of which were contemplated and provided for in the basic design) have been made in the intervening years to increase production to about 225 t.p.h., not including fines.

The only important change made in the quarry proper since the plant went into operation was the addition

By WILLIAM M. AVERY



• Plant of Palmetto Quarries at Columbia, S. C. Arrow points to outlet of tunnel driven from return conveyor pit to drain off water.

in 1944 of a 10-in. gyratory crusher. This additional crushing capacity had no material effect upon production, but it eliminated clogging at the transfer points which probably resulted from the excessive slabbing tendencies of Palmetto's hard granite. This crushing unit supplements a 20-in. gyratory and a 60- by 48-in. Allis-Chalmers jaw, all located on the floor of the quarry. In the revised flow, the entire product of the 20-in. gyratory goes to a 5- by 12-ft. single-deck Tyler Ty-Rock screen located above the 10-in. gyratory crusher. The oversize from this screen is reduced in the small crusher and the material then rejoins the main flow.

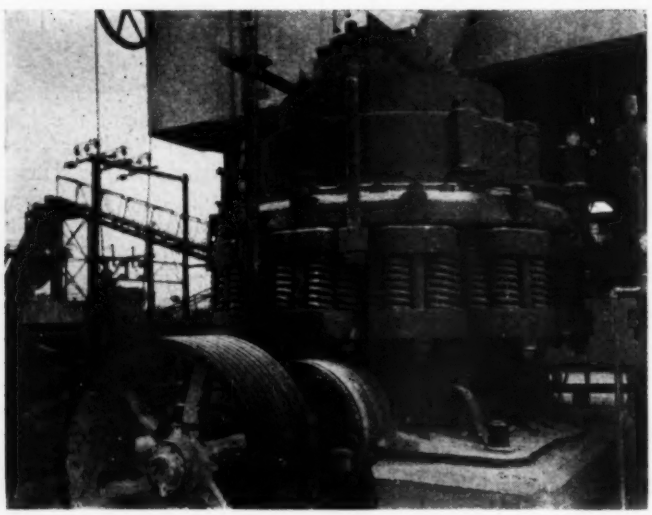
The plant is fed from the quarry by a series of three 24-in. inclined belt conveyors which rise spectacularly some 300 ft. from the floor to the discharge point, traversing a distance of more than 900 ft. The belts on these conveyors have been speeded up from 300 f.p.m. to 400 f.p.m. in order to utilize the capacity of the quarry more fully.

The screening capacity of the plant has been increased by carrying out the original design provision for two screens at each station. Accordingly there are now two double-deck 5- by 12-ft. Robins Gyrex scalping screens at building No. 3, and two single-deck 4- by 10-ft. Robins Vibrex screens at each of the succeeding stations.

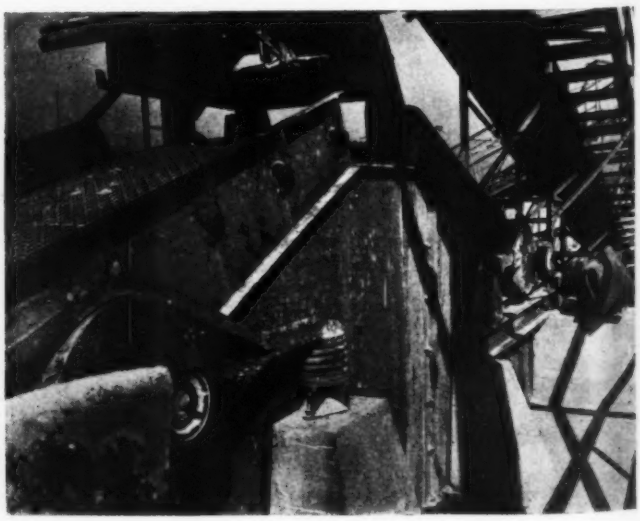
For a time it was found necessary to run the plant all night in order to produce enough fines. To correct this condition the company last fall replaced the original Symons 3-ft. short-head cone crusher with a 4-ft. machine. Since this change was made, the required volume of fines has been produced with little difficulty.

Some difficulty was experienced with excessive water collecting in the return conveyor pit under the

• This crusher was installed to increase production of fines.



• Screen capacity was increased by a 4- by 10-ft. vibrating screen.



plant, despite the fact that a pump had been provided in the original installation. This problem was permanently solved by driving a 6- by 6-ft. tunnel from the low end of the pit to the quarry face, a distance of 167 ft. The company's own crew, under V. C. Dempsey, drill foreman, completed this major operation in just six weeks, without extra manpower or equipment. Subsequent quarry operations have decreased the distance from the conveyor pit to the face, and the tunnel run is now only about 100 ft. to the permanent quarry face.

In the fall of 1943 Palmetto installed a dust collecting system in buildings 3 and 5 to increase the comfort of the men in the plant. Equipment for the system was furnished by the Northern Blower Co. For the present, at least, the recovered product is being wasted. The company has found that both the men and the equipment have benefited from the improved working conditions.

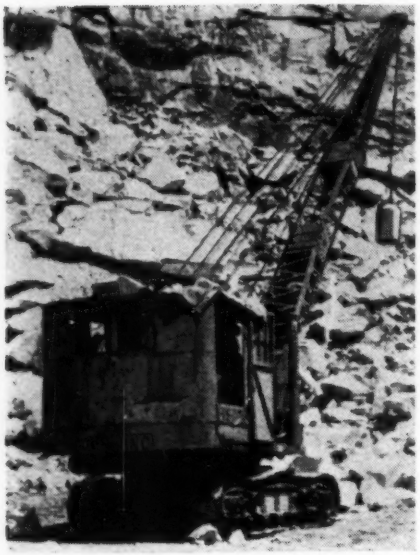
The 200-ft. quarry face is worked in 25-ft. benches, primary drilling being done with Gardner-Denver tripod and wagon drills. In connection with secondary jackhammer drilling operations, the company recently changed to ⅞-in. hexagonal hollow steel dry blower type rods, effecting a considerable increase in the number of holes drilled per man hour and per drill. The capacity of the blacksmith shop has been doubled by installing a second Ingersoll-Rand drill sharpener and a second oil furnace for reconditioning drill steel. A new truck-repair and welding shed, with a 5-ton overhead traveling crane, has also been erected on the floor of the quarry. A new ¾-cu.-yd. General crane has recently gone into service for lowering men and equipment onto the ledges for primary drilling.

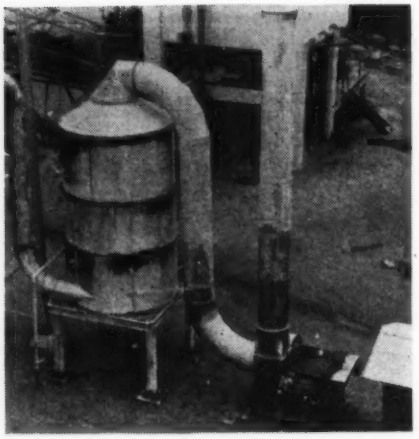
Difficulty in maintaining adequate drill crews during the war caused Palmetto to start experimenting with the drop ball* for secondary breaking. Over a 3-year period every conceivable kind, shape and size of ball has received a thorough try-out. At present the company is using a 5,000-lb. octagonal .50 carbon forged steel billet with a height to width ratio of about to 2 to 1.

• Looking down into the quarry from the ledge.

*See *The Use of the Drop Ball to Reduce Oversize Stone*, PIT AND QUARRY, April, 1947, page 77.

• Left: View of the car-loading building; shuttle conveyor at left, and the cataract washer above.
• Right: Looking down on the drop ball crane from the rim of the quarry.





• Left: The crane, with a 42-ft. boom, which handles the drop ball. • Above: The dust collector which protects workers and equipment. • Right: A closeup of the 5,000-lb. drop ball used for secondary breakage.

The ball has a lug forged in the top, with a hole through which a 14-ft. length of cable is passed. The cable is run through the thimble in the main fall line and tied in a square knot. The main fall line is a non-rotating (pre-formed) wire rope.

The ball is handled with a ¾-cu.-yd. Koehring crane with a 42-ft. boom. Although only about 15 percent of the total secondary breakage is accomplished with the drop ball, the portion handled in this manner consists entirely of scattered material, and the saving in manpower is therefore considerably greater than might be supposed. In any case, the company is well pleased with the results which are being obtained, and it seems quite probable that the drop ball will become a permanent tool in its operations.

E. Lee Heidenreich Jr., consulting engineer, designed the Palmetto plant and supervised its construction. His comprehensive article on the plant, which covered problems of design and selection of equipment, was published in the October, 1944, issue of PIT AND QUARRY. A subsequent article, published in April, 1944, emphasized operating features. The plant now produces more than 600,000 tons per year of crushed granite, screenings, riprap and jetty stone.

George D. Lott, president of the Palmetto Quarries Co., has been a producer of crushed stone since 1914. His sons, G. D. Lott Jr., and Hamilton Lott are respectively vice-president and engineer. Sam C. Dreyfus is secretary and general manager of the company.

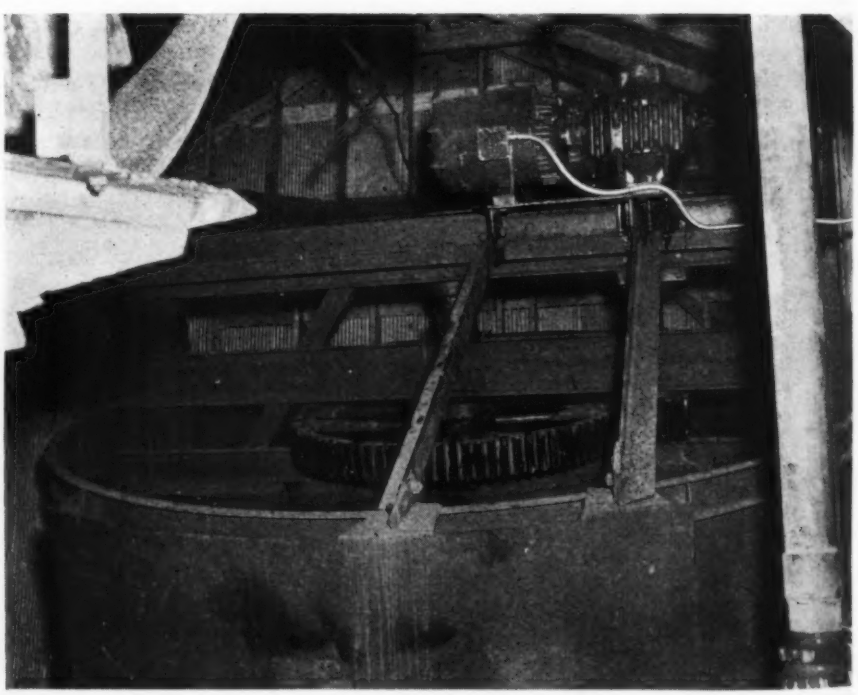
American Aggregates

(*From page* 66)

screen over a separate truck bin located 20 ft. off the railway siding, making a total (including the scalping plant) of more than 630 sq. ft. screen area.

Equipment for sand recovery includes a paddle type sand drag, large tanks for settling fine sand and a rotary sand drag, enabling this plant to produce sand which will meet practically all specifications. A 24-in. boom conveyor discharges sand into a storage pile at the extreme end of the plant.

Materials stored in and adjacent to the three concrete silos are recovered and blended by means of a 30-in. tunnel conveyor under the plant. From the 7- by 170-ft. concrete tunnel the materials are conveyed to a 25-ft. diameter by 36-ft. concrete truck bin, above which is mounted the double-deck 4- by 8-ft. screen referred to earlier. Bituminous surfacing material, consisting of a 50-50 blend of crushed and straight gravel, is conveyed from the truck silo to an adjacent open-storage area. There are two loaded-car storage tracks and two empty car storage tracks between the plant and the main line of the Pennsylvania railroad, which the plant parallels. Carloadings, which account for a major share of all shipments, are handled from a tipple which straddles the tracks.



• A view of the 12-ft. rotary sand drag which the company built in its own shops.

M. G. Kerr of Detroit is district manager of American's Michigan operations, and Edward E. Mills is manager of the plant at Kalamazoo.

Spectrographic Determination of Minor Elements in Portland Cement* — Part I

A rapid spectrographic procedure for the determination of the minor metallic elements in portland cement is described. The method shows promise of easy extension to cement raw materials and many ceramic materials, provided reliable standard samples of these materials are available.

In the application of the method to portland cement, seven minor elements were determined. The precision in terms of probable error of a single determination is within 3 percent of the oxide concentration of aluminum, iron, magnesium, manganese, and titanium; 5 percent of the Na_2O concentration; and 8 percent of the K_2O concentration. Other minor elements, such as lithium, strontinum, chromium, zirconium, and vanadium, may be readily included.

The spectrographic analyses of 21 portland cements are compared with chemical results for an estimate of the accuracy. Salient features of the procedure are (1) employing pellets consisting of cement powder, with graphite as a binder, cobalt oxide as an internal standard, and potassium nitrate as a buffer, (2) applying the pellet as an electrode for excitation by an overdamped condenser discharge, and (3) photographing the spectrum with a step sector and a diffusing screen for obtaining uniformity of illumination.

By ARMIN W. HEEZ and BOURDON F. SCRIBNER

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I. INTRODUCTION

PORTLAND CEMENT is composed of several complex compounds of lime, alumina, silica, and iron oxide. Its approximate oxide composition is given in Table 1. The usual chemical procedures for the analysis of cement are difficult and time-consuming. Unless special care is exercised in chemical separations, errors arise owing to interferences, thus TiO_2 and P_2O_5 may be included with Al_2O_3; Mn_2O_3 with MgO; and if minor alkali elements are present, Li_2O with Na_2O; and Cs_2O and Rb_2O with K_2O. The spectrographic method offers marked advantages of speed, ease of execution, and relative freedom from personal error.

Table 1.—Composition of Portland Cement (Range and Average of 41 Commercial Cements)

Constituent	Range	Average
	Percent	Percent
CaO	59.6 to 67.0	63.6
SiO_2	20.0 to 27.5	22.3
Al_2O_3	2.0 to 6.3	4.7
Fe_2O_3	1.9 to 5.5	3.4
MgO	0.7 to 4.4	2.1
SO_3	1.3 to 2.3	1.8
Na_2O	0.03 to 1.2	0.25
K_2O	.04 to 1.4	.45
P_2O_5	.03 to .46	.14
Mn_2O_3	.03 to .50	.18
TiO_2	.10 to .30	.22
Ignition loss	.60 to 2.2	1.0
Insoluble residue	1.02 to .40	.14

The initial application of the spectrograph to analysis of portland cement by the Bureau's spectrochemical labortory was made on the determination of the alkali elements [1].[1] The fullest advantage of a spectrographic method is realized when a number of elements are determined simultaneously. Consequently, an investigation was undertaken to extend the determinations to include aluminum, iron, magnesium, manganese, and titanium. At the same time the possibility of applying a modified technic to improve the alkali determinations was considered.

In the method previously reported for the alkalis, a fixed amount of the sample mixture was placed in the crater of a graphite electrode that formed the lower positive element of direct-current arc. This method has the advantages of employing the relatively inexpensive direct-current type of excitation and providing for the detection of very low concentrations. The disadvantages of the method are (1) the requirement of red-sensitive plates that tend to be nonuniform, (2) the difficulty of handling small samples in powder form, and (3) the requirement of additional procedures for lithium and for high potassium concentrations. The procedure to be described has none of these disadvantages and permits the determination of aluminum, iron, magnesium, potassium, sodium, manganese, and titanium. In addition, lithium, strontium, chromium, zirconium, and vanadium were considered, but they were not found in any of the cements analyzed in sufficient quantities to warrant their detailed study Lines of these elements suitable for observing concentrations down to about 0.1 percent are found in the same spectral region used for the other elements. Calcium, silicon, sulphur, and phosphorus are not determined by this method. The first two elements, because of their high concentration, cannot be determined with sufficient precision to rival chemical methods. The latter two elements have poor spectral sensitivity, and special procedures would be required for their determination. The method shows promise of easy extension to the analysis of cement raw materials and many ceramic materials, if reliable standard samples of these materials are available.

II. DEVELOPMENT OF THE METHOD

1. Spectrographic Studies

In the paper on the determination of the alkalies in portland cement (1) the K 7698.98 and Na 8194.81 A lines were used in preference to K 4044.14 A and Na 3302.32 A because of the higher intensity and greater freedom from background. The shorter wavelength potassium and sodium lines are much more useful because of their proximity in wavelength to lines of other minor elements. The procedure described in this paper successfully makes use of the K 4044.14 and Na 3302.32 A lines through the choice of excitation, and the form and composition of the electrode. The potassium line tends to be broad and diffuse. This, however, does not seriously impair its usefulness for quantitative work.

There was no difficulty in finding suitable iron, magnesium, and titanium arc lines. Their selection was based on consideration of intensity, proximity to other lines being measured, and freedom from interfering lines. Limitations of intensity and background narrowed the choice of magnesium lines. The Mg 3332.13 A line was successfully used, though it tends to be weak and diffuse. Attempts were made to use an aluminum line falling within the region 2800 to 4200 A photographed for the other elements. Aluminum lines in this region were either too intense or failed to show a favorable intensity-concentration response. For this reason the Al 2660.39 A line was selected. A coincident line, Fe

*Presented at the meeting of the American Ceramic Society on April 30, 1946, and published in the Journal of Research of the National Bureau of Standards, Vol. 38, April, 1947.

[1]Figures in brackets indicate the literature references at the end of this paper.

2660.40 A, did not interfere with the aluminum line at the concentrations of iron encountered in cements. The weaker line, Al 2653.49 A, is suggested as an alternate for the determination of aluminum.

The spectrum was photographed with a Baird grating spectrograph having a linear dispersion of approximately 5.5 A per millimeter. An intensity pattern is obtained with a five-step rotating sector and a thin silica lens, the combination being located at the secondary focus of the spectrograph. The lens serves to focus an image of the arc on the grating of the spectrograph. This arrangement is not sufficient for obtaining uniform illumination as the arc is very large and the distribution of the intensities of the lines of the several elements varies at different points in the arc. This is particularly true of the alkali lines as compared with those of the internal standard and the other elements sought. This difficulty is minimized by placing a diffusing screen at the position where the arc would normally be and moving the arc to a position of 8 cm. behind the screen.

The arc stand has been described by Scribner and Corliss [2]. The adapter (Fig. 1) used to hold ½-in.-diameter pellet electrodes in this stand will also serve with any other electrode holder that will clamp rods ¼ in. in diameter in accurate alinement. The clamping action of the stand on the split rod of the adapter securely clamps the sides of the pellet. The pellet extends well above the rim of the adapter so that the arc strikes only the top face of the pellet. With proper clamping, the bottom of the pellet and the adapter remain perfectly clean and free from burning.

The diffusion screen is similar to that discussed by Hansen [3] and consists of a vitreous silica plate, 45 mm. in diameter, ground, and etched for maximum transmission, with good diffusion. It is made by grinding a clear silica plate on one side with grade *F* silicon carbide and then etching in dilute hydrofluoric acid for about half an hour. The etching is discontinued when inspection with magnifying lens shows that the irregular scratches of the grinding are smoothed out in hemispherical pits. Details of photography, microphotometry, and calculations follow standard procedures, for which adequate references are available [4, 5].

2. Method of Excitation

Three means of excitation were investigated: (1) direct-current arc, (2) alternating-current arc, and (3)

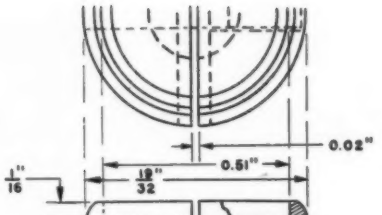

Figure 1.—Pellet holder, front and top views. It is made by turning two pieces of brass clamped together with a metal spacer 0.02 in. thick. Two steel-pin guides (A, B) are soldered to the left side and extend into oversized holes in the right side.

overdamped - condenser discharge. The latter appeared more promising for a simultaneous determination of all minor elements than the other types of excitation. Tests indicated that insufficient reproducibility was obtained for the alkalis with the d.-c. or a.-c. arcs, but such arcs did show possibilities of giving satisfactory results for other minor elements.

The overdamped-condenser discharge was obtained with a "multisource unit" [6, 7]. This instrument supplies a large number of discharges intermediate between the electric arc and electric spark. The arc-like discharge was chosen because of sensitivity and interference considerations, and has the current characteristic shown in Figure 2. The circuit constants given in the procedure below are optimum for reliable operation of the power unit under high-energy and high-damping requirements. The large gap is essential for stable operation and the negative polarity of the sample-bearing electrode was chosen because of enhanced spectral intensity.

3. Electrode Form, Composition and Preparation

Numerous tests showed that improved reproductibility could be obtained with the pellet method of placing the sample in the arc; furthermore, the spectral background was considerably reduced. The pellets are disk-shaped ½ in. (13 mm.) in diameter and ⅛ in. (3 mm.) thick. Second-grade spectroscopic rods ⅛ in. in diameter cut into electrodes ¾ in. (19 mm.) in length and rounded at one end served as the upper, positive, electrode.

Graphite proved to be an ideal admixture with the cement for obtaining a pellet which, upon burning, was slow to form a crust. With this type of pellet a constant ratio of intensities of lines of the various elements is maintained for a fairly long burning time. The concentration of cement was made as high as possible in order to obtain suitable intensities of the desired lines (particularly for the alkalis). The upper limit was found to be about 60 percent cement, which, if exceeded, produced erratic burning and crust formation.

Cobalt oxide is added for the internal standard. Cobalt has a sufficient number of lines to provide suitable reference lines in any part of the spectrum, and has evaporation and excitation characteristics that are a fairly good average of the properties of the elements sought. The purest compound of cobalt available was $Co(NO_3)_2.6H_2O$, from which the oxide was prepared.[2]

An important problem was the effect of varying potassium content on the intensity ratio of sodium to cobalt. The spectra of other minor elements showed little alteration with respect to cobalt lines. The choice of another internal standard, strontium, for example, would prove better for sodium but poorer for the other minor elements. A single internal standard could not be ideal for all the elements in question because of difference in properties of the elements to be determined. The method and reason for reducing the potassium interference in preference to adding a second internal standard follows. It was observed that the interference due to potassium tends toward a maximum with increasing potassium concentration—there being little further change above 1.0 percent K_2O. It was found desirable to increase the potassium content in order to increase the potassium line intensity relative to the background. Thus, by adding a known amount of potassium as a buffer, the amount of potassium in the sample could be determined by difference. Increasing the total amount of potassium, however, decreases the accuracy of the determination of the potassium in the sample. The addition of po-

[2]Cobalt oxide was prepared by carefully heating the nitrate in a Pyrex beaker to remove water and oxides of nitrogen. The product was crushed and passed through a No. 48 sieve and then transferred to a platinum dish and heated to about 900°C for several hours. Finally, the oxide was passed through a No. 200 sieve.

tassium nitrate to the sample equivalent to 0.7 percent K_2O was found to be a suitable compromise. The nature of the compound used for this addition proved to be important. The addition of potassium carbonate resulted in poor burning behavior whereas potassium nitrate resulted in very smooth burning with all types of cements. The arc under these conditions continuously played over the central half of the area of the electrode without remaining at any one point for more than a fraction of a second.

The ingredients of a pellet are (1) cement, (2) powdered graphite, and (3) a potassium nitrate—cobalt oxide mixture in the proportions given in section III. The latter mixture is prepared in advance in sufficient quantity for a large number of determinations and is mixed by grinding and sieving, first through a No. 325 sieve and then several times through a No. 200 sieve. The above three constituents of the pellet are weighed, as specified in the procedure, mixed, and used for a single pellet. The final mixing may be done by passing the material through a No. 100 sieve three or more times. However, the following procedure for mixing is faster, with less chance of introducing errors. A number of vials are prepared, each one to hold a sample mixture.[3] A vial containing the ingredients of a pellet is placed in a plastic holder, shown in Figure 3, and clamped to an electric-motor shaker for mixing. The clamp is designed to press the cover[4] against the vial and to hold the entire assembly in place. A dental-type amalgamator shakes the vial in a figure-8 motion at high speed. Twenty seconds of shaking is sufficient for complete mixing. A number of sample mixtures are prepared simultaneously. When making a pellet the complete content of a vial is poured into the mold. Sufficient pressure is applied in the press to give a well-formed, compact pellet capable of easy handling.

III. PROCEDURE

The following three materials are weighed into a glass vial for mixing: (1) Spectrographic graphite powder (Note 1, Table 2) 0.440 g.; (2) potassium nitrate—cobalt oxide mixture, 0.0575 g.; (3) portland-cement sample, 0.500 g. Mixture 2 is

[3]The vials are prepared by cutting off thin glass vials ⅝ in. (16 mm.) in diameter, and grinding, and polishing the open ends to a total length of 1⅜ in. (35 mm.).

[4]A thin rubber sheet cemented to the cover of the holder and pressed against the ground and polished ends of the vials efficiently retains the material during mixing.

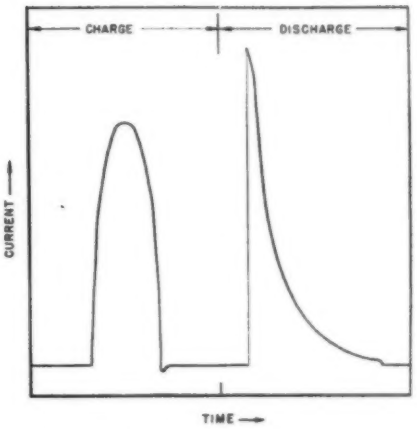

Figure 2.—Sketch of oscillogram of over-damped-condenser discharge, showing the change of current with time for charge and discharge of the condenser.

prepared with 5.000 g. of cobalt oxide and 0.750 g. of potassium nitrate, as already described. If the cement has been stored for a considerable time or exposed to air, it should be ignited at 900° C. and passed through a No. 100 sieve. Pellets are formed in a mold ½ in. in diameter at a total load of about 8,500 pounds. The value of the pressure is not critical, except that it should be kept constant. Any burrs on the pellet are scraped off and the pellet brushed clean, all handling being done with forceps. Details for making the spectrogram are outlined in Table 2.

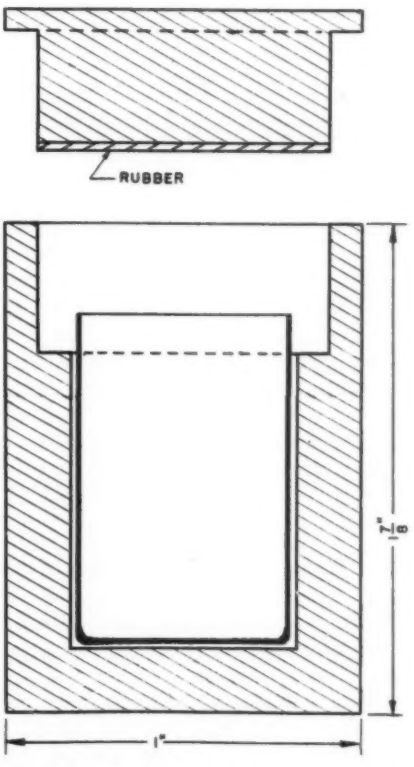

Figure 3.—Plastic holder and cover (Lucite) for mixing, showing a glass vial in place. The rubber lining of the cover is cut from a dental rubber dam 0.014 in. thick.

Table 2.—Operating Conditions for Analysis of Portland Cement

1. Upper electrode	Graphite rod, ¼ in. in diameter by ¾ in. long, rounded at one end.
2. Lower electrode	Cylindrical pellet ½ in. in diameter, representing the prepared sample mixture, polarity negative (note 2).
3. Gap	8-mm. initial setting, unaltered during exposure.
4. Alinement	Top of pellet 3 mm. below the optic axis.
5. Optics in front of slit	Light passes from the arc 8cm. to diffusing screen, thence 40 cm. to illuminating lens (f_D=44 cm), thence 1.5 cm. to rotating step sector, and finally 10 cm. to slit.
6. Power	Multisource unit, over-damped condenser discharge (note 3).
a. Capacitance	45 μf.
b. Inductance	400 μh.
c. Resistance	40 ohms.
d. Phase angle	30 degrees.
e. Output potential	940 v.
f. Input current	2.4 A.
7. Exposure time	45 seconds.
8. Spectograph	Grating, Eagle mounting. 5.5 A/mm.
a. Grating aperture	Full opening of grating used.
b. Slit width	50 μ.
c. Region	4200 to 2900 A, and 3500 to 2200 A.
9. Photographic plate	Eastman Spectrum Analysis No. 1.
10. Development	2.5 minutes, 21°C, Eastman formula D-19, continuous agitation.

NOTE 1.—A pure form of graphite powder suitable for forming the pellets was obtained from the National Carbon Co.

NOTE 2.—One side of the pellet may be used for the aluminum determination and the other side for the other elements when the apparatus will not permit covering the entire region (4,100 to 2,600A) with a single exposure.

NOTE 3.—Before running samples for analysis, the source unit must be warmed-up by running several blanks.

Reduction of measurements follows standard procedures. Intensities of the lines of the elements sought relative to the intensities of neighboring cobalt lines are derived from plate characteristic curves (transmittancy vs. log relative intensity) established for each of the first three groups of lines indicated in Table 3. The log intensity ratios are converted to concentrations of the elements by means of analytical curves. The latter are determined by applying the same spectrographic procedure to portland cements of known composition. The majority of photometric measurements are made in the second and third steps of the intensity pattern. The Li, Cr, Sr, V, and Zr lines listed in Table 3 are for qualitative observation. These elements were not found in appreciable amounts in any of the 41 cements studied. Therefore, the lines were not tested for quantitative work but are of an intensity suitable for detecting oxide concentrations in the neighborhood of 0.05 percent. A weak cobalt line tends to interfere with the lithium line, but lithium can be detected in amounts as low as 0.1 percent of Li_2O.

Table 3.—Lines Employed in the Analysis of Portland Cement (Wavelengths in Angstroms)

Element	Analytical Line	Internal Standard (Cobalt Lines)	Concentration Range (as Oxide)	Index [a]
			Percent	Percent
K	4044.14	4020.90	0.04 to 1.4	1.3
Mn	4041.37	4020.90	.03 to 0.50	0.15
Fe	4005.25	4020.90	1.9 to 5.5	2.6
Ti	3998.64	4020.90	0.10 to 0.30	0.18
Mg	3332.15	3322.20	.70 to 4.4	3.4
Na	3302.32	3322.20	.03 to 1.2	0.34
Al	2660.39	2648.64	2.0 to 6.3	4.4
Li	3232.61	.....	.....	.....
Cr	3578.69	.....	.....	.....
Sr	3464.46	.....	.....	.....
V	3183.41	.....	.....	.....
Zr	3391.97	.....	.....	.....

[a] The index is the concentration for which the intensities of the analytical line and the internal standard line are equal.

IV. RESULTS AND DISCUSSION

1. Analytical Curves

Figure 4 illustrates the analytical curves as determined from the reference series of 20 cements discussed in Section IV, 3. The curves are not directly applicable in another laboratory because they are a function of the particular spectrographic installation. All the analytical curves are straight lines, except that for aluminum. An auxiliary scale, shown for the potassium curve, automatically deducts the 0.7 percent of K_2O added to the sample.

The analytical curves have been found to be quite stable in general, but an unexplained shift has been observed for the potassium curve. This shift has occurred after an interruption in the work for about a month. This indicates the advisability of periodic check-ups on the potassium determination with standard samples.

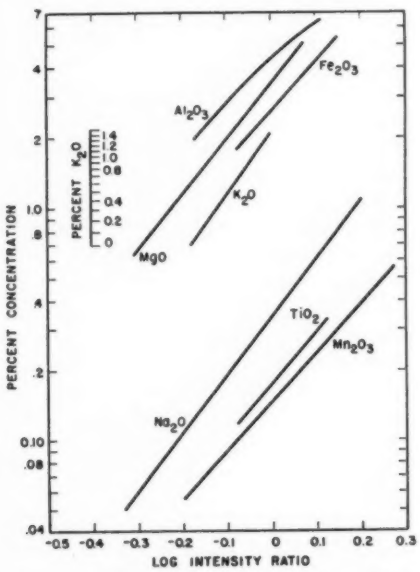

Figure 4.—Analytical curves for the analysis of portland cement. The log intensity ratio and the percentage concentration are plotted for the following line pairs: K 4044.14/Co 4020.90; Mn 4041.37/Co 4020.90; Fe 4005.25 /Co 4020.90; Ti 3998.64/Co 4020.90; Mg 3332.15/Co 3322.20; Na 3302.32/Co 3322.20; Al 2660.39/Co 2648.64. The auxiliary concentration scale for potassium oxide corrects for potassium added to the sample. The analytical curves are shown for illustrative purposes only.

2. Precision of Determinations

Estimates of precision were based on 6 determinations of the minor elements in 8 portland cements, or 48 determinations in all. The precision is an indication of the degree of reproducibility but does not indicate constant errors due to such factors as chemical combinations of the minor elements, varying composition of the major elements, interfering elements, self-reversal, etc. Good precision, however, is a necessary condition for accuracy. In the second column of Table 4, estimates of precision in terms of percentage concentration of the component are given.

Table 4.—Precision and Accuracy of Determinations of Constituents in Portland Cement

Component	Precision[1] (Probable Error (%) of a Single Determination)	Accuracy[2] (Average Concentration Difference (%) of Sample)
Al_2O_3	3	0.25
Fe_2O_3	2	.12
MgO	3	.14
Na_2O	5	.02
K_2O	8	.06
Mn_2O_3	3	.01
TiO_2	2	.01

[1] Based on reproducibility.
[2] Based on differences between spectrographic and chemical determinations.

The probable error of a single determination is within 3 percent of the oxide concentration for aluminum, iron, magnesium, manganese, and titanium, 5 percent of the Na_2O concentration, and 8 percent of the K_2O concentration. The larger values for the alkalis may be due to different characteristics of volatility and excitation for the alkalis and the internal standard. Ease of contamination and the necessity of adding potassium nitrate to the sample, with the subsequent problem of mixing, may also be contributing factors to decreased precision for the alkalis.

3. Accuracy of Determinations

A measure of accuracy is obtained by comparing the chemical and spectrographic results of a large number of cements. Thus, possible effects of varying composition and of interfering elements are included. Two groups of cement samples that had been carefully analyzed were available. One group of 20 cements was used for determining the analytical curves, the second group of 21 cements was analyzed as unknown. The use of analyzed cements for standards is considered a more trustworthy procedure than the use of synthesized standards. In order to avoid the effects of differences in chemical combinations, the synthesized standard mixtures would have to be heated to a high temperature to produce a product comparable to cement. This operation may cause alterations in composition, so that checking by means of chemical analysis would still be required.

Table 5 gives a comparison of the spectrographic results (columns A) with chemical results (columns B and C). The spectrographic results shown are the averages of three determinations, and the chemical results are averages of three or more determinations. The chemical results represent work by three well-qualified laboratories, and are in much better agreement than the work of the usual control laboratory. Values in columns B are the results of one laboratory, and those in columns C are the results of two other laboratories (six samples by one, and four by another).

A summary of these results, in terms of the average differences between the spectrographic (A) and the chemical results of column B, is shown in the third column of Table 4. The average difference between the chemical and spectrographic values for Al_2O_3 is given as 0.25 percent, whereas that for TiO_2 is 0.01 percent. Because of the differences in concentration between Al_2O_3 and TiO_2, the above values represent about the same relative accuracy, that is, 5 percent of the concentration. The average difference between the chemical and the spectographic values for Fe_2O_3 and MgO are a little above 0.1 percent, and for the remaining oxides, except Al_2O_3 mentioned above, are well below 0.1 percent.

4. Precisions Required in Details of the Procedure

In order to determine the care required in executing certain details of the procedure and to indicate possible sources of error, several series of tests were made: (1) exposure time varied 5 seconds, (2) output potential varied 20 v. (3) vertical adjustment of the arc varied 2 mm., and (4) pellet-forming load varied 1,000 pounds. The effects of these variations on the observed concentrations of K_2O, Fe_2O_3, MgO, and Ma_2O are given in Table 6, each result being the average of six deter-

Table 5.—Comparison of Spectrographic and Chemical Results for 21 Portland Cements—Weight Percent

No.	Al_2O_3[a]			Fe_2O_3[a]			MgO[a]			Na_2O			K_2O			Mn_2O_3			TiO_2		
	Spec. A	Chem. B	Chem. C	Spec. A	Chem. B	Chem. C	Spec. A	Chem. B	Chem. C	Spec. A	Chem. B	Chem. C	Spec. A	Chem. B	Chem. C	Spec. A	Chem. B	Chem. C	Spec. A	Chem. B	Chem. C
1	5.3	5.6	.....	2.4	2.4	.....	3.6	3.6	.....	0.25	0.24	.....	0.61	0.59	.....	0.08	0.07	.....	0.24	0.23	.....
2	5.4	5.8	.....	2.4	2.4	.....	3.2	3.3	.....	.37	.36	.....	.55	.45	.....	.11	.11	.....	.26	.24	.....
3	4.6	4.7	4.7	2.3	2.1	2.3	1.4	1.0	1.1	.04	.03	0.04	.20	.19	0.21	.10	.09	0.08	.29	.30	0.33
4	4.5	4.7	4.7	2.9	3.0	3.1	2.4	2.4	2.2	.05	.06	.07			1.4	.14	.13	.13	.23	.21	.28
												1.5	1.4								
5	5.6	5.4	.....	2.6	2.5	.....	.88	.71	.....	.07	.06	.....	.20	.19	.....	.06	.07	.....	.26	.27	.....
6	4.9	4.7	.....	3.4	3.5	.....	1.9	1.9	.....	.30	.28	.....	.50	.49	.....	.13	.13	.....	.26	.26	.....
7	5.4	5.4	.....	3.0	3.1	.....	1.07	.94	.....	.08	.07	.....	.44	.44	.....	.17	.16	.....	.30	.30	.....
8	5.8	6.1	.....	2.2	2.3	.....	2.1	2.1	.....	.14	.16	.....	.02	.13	.....	.50	.50	.....	.23	.24	.....
9	4.0	4.0	.....	3.2	3.2	.....	1.2	1.2	.....	.31	.25	.....	.59	.44	.....	.08	.09	.....	.24	.23	.....
10	4.8	5.5	.....	3.8	3.9	.....	3.3	3.1	.....	.28	.26	.....	.40	.39	.....	.06	.07	.....	.31	.30	.....
11	4.7	4.3	4.2	6.0	5.4	5.5	.95	.85	.71	.71	.66	.70	.31	.15	.15	.07	.07	.06	.30	.29	.36
12	4.7	4.8	4.9	4.8	4.9	4.9	2.9	2.8	2.5	.05	.05	.05	1.3	1.4	1.4	.32	.30	.29	.23	.21	.26
13	4.7	4.6	.....	5.0	4.9	.....	2.2	2.2	.....	.26	.25	.....	.55	.54	.....	.05	.06	.....	.27	.27	.....
14	5.5	5.0	.....	2.3	2.1	.....	3.8	3.2	.....	.28	.28	.....	.25	.26	.....	.09	.09	.....	.21	.22	.....
15	5.4	5.2	.....	2.7	2.5	.....	1.5	1.4	.....	.29	.27	.....	.56	.46	.....	.07	.06	.....	.27	.27	.....
16	4.5	3.9	4.0	3.3	3.3	3.4	2.7	2.3	2.3	.36	.32	.28	.27	.26	.28	.22	.22	.....	.22	.23	.....
17	4.2	4.6	4.5	4.8	5.0	5.0	2.6	2.7	2.4	.04	.05	.05	1.1	1.3	1.3	.29	.32	.28	.21	.23	.25
18	2.8	2.8	2.9	2.6	2.7	2.8	1.6	1.7	1.8	.16	.16	.15	.17	.24	.28	.15	.17	.....	.14	.16	.....
19	3.6	3.7	3.5	3.1	3.1	3.2	1.2	1.0	1.4	.38	.38	.33	.04	.04	.01	.11	.11	.....	.17	.19	.....
20	5.1	4.9	4.7	4.7	4.5	4.8	1.4	1.5	1.6	1.09	1.17	1.04	.16	.12	.08	.10	.11	.....	.24	.25	.....
21	3.3	3.1	3.1	3.3	3.3	3.4	1.7	1.6	1.5	.08	.08	.08	.35	.27	.27	.09	.09	.09	.16	.19	.17

[a] Chemical values under B and C are corrected for minor oxides.

minations. The first and last lines give values for the normal operating conditions. The effects of variations in operational details are considered very small in view of the magnitudes of the variations, which are much greater than will be encountered in routine work with reasonable care. Nearly as great as the effect of the variations in operating conditions considered above is a warmup effect of the power unit. This may be minimized by running several blanks before starting a series of determinations and also every time the series has been interrupted for a much longer time than that required between exposures.

5. Advantages and Limitations of the Method

The chief advantage of the spectrographic method is the short time required to make the analysis. An operator can make duplicate determinations of the seven indicated minor elements in eight portland cements in a day's work and include a visual estimate of other possible minor elements under conditions not adjusted for high speed. Easy extension of the method to include additional elements is a unique characteristic. The direct use of the cement powder is a distinct advantage over methods requiring solution of the sample and chemical separations. Freedom from rigorous attention to details make personal errors much less likely than in chemical methods or even in the earlier direct-current spectrographic method [1].

A limitation of the spectrographic method is the requirement of standard samples. The compounds containing the elements sought and the nature of the major components (bulk of the sample) must be similar for knowns and unknowns, unless tests are made to prove allowable exceptions. The initial cost of spectrographic apparatus is high. This is particularly true for the present method because of the type of excitation required. In view of the speed and labor-saving features, however, the cost per sample analyzed can be very low when large numbers of determinations are required. The type of excitation employed is similar to an interrupted direct-current arc. The possibility of substituting a simpler means of producing such excitation is suggested.

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Table 6.—Effect of Variable Operating Conditions on Apparent Composition (Values in Italics Represent Deviation from Standard Procedure)

Operating Conditions				Apparent Composition (Weight Percent)				Remarks
Exposure Time	Output Potential	Vertical Distance Between Lower Electrode and Optic Axis of Spectrograph	Pellett-forming Load	K_2O	Fe_2O_3	MgO	Na_2O	
Seconds	v.	mm.	lb.					
45	940	3	8,500	0.28	3.6	2.8	0.42	Beginning, normal.
40	940	3	8,500	.21	3.5	2.7	.43	Exposure time short.
60	940	3	8,500	.27	3.6	2.9	.42	Exposure time long.
45	*920*	3	8,500	.21	3.5	2.7	.43	Voltage low.
45	*960*	3	8,500	.28	3.5	2.8	.42	Voltage high.
45	940	*1*	8,500	.28	3.5	2.9	.44	Arc position high.
45	940	*5*	8,500	.19	3.4	2.8	.42	Arc position low.
45	940	3	*7,500*	.26	3.5	2.6	.41	Pellett-forming pressure low.
45	940	3	8,500	.24	3.4	2.8	.43	End, normal.

N. S. & G. Assn. Directors Schedule Coming Events—Discuss Critical Problems

another ON THE SPOT report

THE board of directors of the National Sand & Gravel Assn. held its semi-annual meeting at the French Lick Springs Hotel, French Lick Springs, Ind., August 12, 1947. R. N. Coolidge, president of the association, called the meeting to order, and the routine business of the association was disposed of. The series of membership meetings held in various parts of the country was then described and it was decided that these should be a regular part of the program.

By WALTER E. TRAUFFER

1948 Annual Convention Vincent P. Ahearn, executive secretary, then gave an outline of future convention dates which now have to be decided on well in advance because of the difficulty in getting the necessary accommodations. The 1948 convention, as has already been reported, will be held at the Netherland Plaza Hotel, Cincinnati, January 20 to 23, and an exhibit of machinery will be held in connection with it. As was the case at the convention in Los Angeles this year, the directors' meeting will be held on Monday morning. The National Ready-Mixed Concrete Assn. board meeting will be held in the afternoon, following a joint luncheon. The first sand and gravel meeting will be held on Tuesday and the first ready-mix meeting on Wednesday. Except for the annual reception of the manufacturers' division on Wednesday, the evenings will be left open. The joint luncheon of the two associations will be held on Thursday, with some well-known personage as speaker.

Later Meetings It was also announced that the 1949 meeting will be held in New York, at the Hotel New Yorker, the week of February 14. The location of the 1950 convention has not yet been selected, but it will be held either in Chicago or St. Louis, where adequate facilities for a machinery exhibit are available. The 1951 annual convention will be held at the Roosevelt Hotel, New Orleans, the week of February 11. After some discussion it was voted to hold the 1948 semi-annual meeting of the board of directors at the Broadmoor Hotel, Colorado Springs, Colo., on Sept. 20, 21 and 22. The ready-mix directors approved the dates.

Stanton Walker, appointed Harvard lecturer on concrete technology.

Cost Accounting Mr. Ahearn then gave the board a progress report on the cost accounting system and said that O'Neal Johnson, a former producer, and a certified public accountant, had been retained to handle the project. A committee was appointed to study this system before it becomes a printed document.

Fellowship Stanton Walker, director of engineering, advised the board of a proposed revised agreement for the fellowship sponsored by the association at the University of Maryland, calling for an increase in stipend to $750 and for the appointment of two fellows instead of one. Automatic renewal is provided for. This action was approved by the board.

Short Course Mr. Walker then described the short course held in 1946 and the proposed one to be held the week of November 17, 1947. The first course, he said, was rather general, and he recommended that the next one be restricted to the general subject of the design of concrete mixtures, with the one in 1948 again to be a general one. It was decided that this course should be held, and this later met with the approval of the ready-mix board. No action was taken on a suggestion that regional short courses be held in cooperation with colleges in various sections.

Industry Problems Considerable time was spent at this meeting in discussing industry problems raised by federal law. These included the application of the Taft-Hartley Act to these industries; the validity under the Labor-Management Relations Act, 1947, of a strike to compel recognition; the need for amendments to the Wage-Hour Law, etc.

It was also agreed that the American Assn. of Railroads be advised that the acute freight car shortage is a pressing problem for the industry. A report was presented to the board on the work of a committee on association policy in railroad revenue proceedings. The board approved the recommendation to oppose any increase in sand and gravel freight rates in view of the fact that existing rates are driving business away from the carriers. It also approved the recommendation that, if the industry must accept an increase in rates, such an increase should be expressed as a percentage with a maximum in flat cents per ton.

Engineering Department Mr. Walker gave his semi-annual report on the activities of the engineering department, the cooperative investigations being made with certain state highway departments, his inspection trip of highways in the Southeastern states, and his work with other organizations. The board was also advised by Mr. Coolidge that Mr. Walker had been added to the faculty of Harvard University to lecture on concrete technology.

General The board was informed of the recent death of one of its members, Walter F. Jahncke, vice-president of Jahncke Service, Inc., New Orleans.

At this meeting Nathan C. Rockwood was elected an honorary member of the board of directors and of the association, a well-deserved honor because of his many years of service to the industry and the association. The ready-mix board later accorded him the same honors.

Loomis Talc Makes Improvements In Mining and Packing Facilities

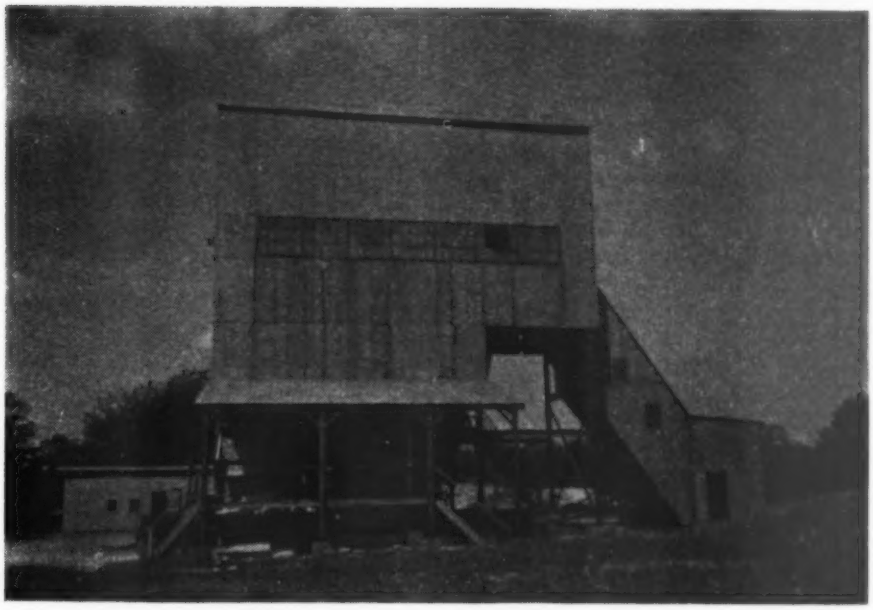
By W. M. AVERY

another ON THE SPOT report

THE W. H. Loomis Talc Corp. of Gouverneur, N. Y., one of the oldest talc producing concerns in the United States, has within the past year completed a modernization program designed chiefly to increase labor efficiency in its mining and packing operations. The company operates six plants in all—three mines located near Fowler, N. Y., and three mills located at Emeryville, just outside Gouverneur.

Like most mine operators, Loomis up until World War II had made liberal use of the plentiful labor supply in the area of its operations. In the mines cars were loaded laboriously by hand and pushed by hand from the working faces to the shafts over distances ranging from 1,000 to 2,000 feet. By the hand method one man could load a car in 30 minutes, or about 16 cars in a day. Some of the men thus employed worked on an hourly basis, while others were on a contract basis; but under either plan it was a costly and inefficient method of moving material.

Although a mechanization program was in prospect even before the war, the need became more urgent when the mounting manpower shortage threatened serious curtailment of production in the company's three mines. Almost at one stroke loading costs were reduced to a fraction of their former level by the purchase of four Eimco-Finlay Model 12-B loaders. These machines are powered by two specially-designed Ingersoll-Rand air motors—one furnishing power for propelling the machine, crowding the bucket into the muck pile, and the other driving the elevating and dumping mechanism. Either motor can be operated as rapidly or as slowly as desired—separately or simultaneously. The Model 12-B (which is the smaller of the two models manufactured by Eimco) operates efficiently at 60 pounds pressure.



• A view of the top house of the No. 3 mine, W. H. Loomis Talc Corp., Gouverneur, N. Y. Muck from the mine shaft (right) is hand-sorted and stored in three 50-ton bins. Run-of-the-mine material is chuted into 1½-ton end-dump trucks and hauled to the mills.

The mechanical loaders have eliminated most of the hand loading at all three of the Loomis mines. They load cars at an average rate of three to four minutes per car, against the 30 minutes required with hand loading. Two of the machines operate on the 10th and 15th levels of the largest mine (No. 1), and one at each of the other two mines.

To keep pace with this vastly increased loading capacity, Mancha Little Trammers were purchased for each of the mines. These battery-powered locomotives handle five-car trains, eliminating three to four men for every train moved. At each mine they are operated at the particular level on which most of the work is done. The Trammers are

• Below, left: Four of these mechanical loaders are now in operation in the company's three mines. They load mine cars in 3 to 4 minutes, as against about 30 minutes required with hand loading.

• Right: Electric trammers now haul 5-car trains from the working faces to the shafts, eliminating three to four men for every train moved.

also used extensively for transporting muckers, timbers, drilling equipment and other machines from one location to another in the mines.

Drilling and blasting practices have remained substantially unchanged. For drift work Ingersoll-Rand jackhammers are used—JA-45's in hard ground and JA-35's in soft ground. Depending on the particular location of the work, these may be mounted on standard I-R jacklegs, bars, or on a special jumbo built in the company's own shop. Ingersoll-Rand R-48 stopers are used in the raises. All drilling was formerly done dry, but about four years ago wet drilling was adopted in order to eliminate dust. Although it was feared that this change might have an adverse effect at the mills, actually very little difference was noted.

In each of the mines levels are run about 100 feet apart within the vein, which raises approximately every 50 feet—some connected with the level above and others not connected. The drifts vary in length up to 1,400 or 1,500 feet. On the west side of the Arnold shaft the drifts run up to 1,800 feet in length with about 36 raises, but this is an extreme condition not encountered in the other mines. At this mine two Ingersoll-Rand air-operated scraper hoists are in use—one on the 14th level scraping muck down out of the stopes and loading it into cars, and the other on the bank scraping muck from windrows into trucks.

At No. 3 mine, where the accompanying pictures were taken, the muck is chuted into a 1½-ton skip, which discharges on the floor of the top house built over the shaft. Grading is done here by visual inspection, and the material is sorted in three bins, the three classifications being run-of-the-mine, off-color stock, and wet waste or waste that contains a high percentage of lime, silica or quartz. Between 11 and 12 percent of all the material mined is waste, and in a bad month the figure may soar to as high at 25 or 30 percent. The waste is trucked to nearby spoil piles against a future day when reclaiming operations may be feasible.

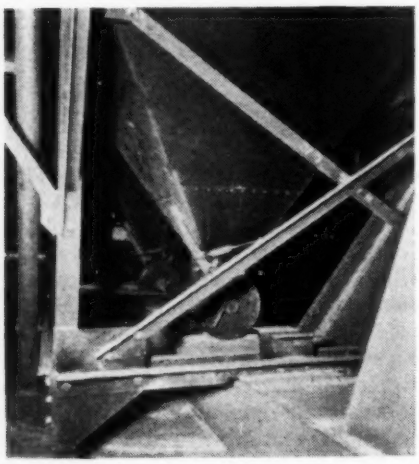
Fairly representative of all the mines, the No. 3 unit produces between 1,500 and 1,600 tons of material per month. On actual production 15 men are employed underground. In addition two sorters, a compressor man and a hoist man work on top. Most of the work at this mine is on the 5th level, approximately 500 feet below the surface. Air is furnished by a Sullivan WN-112 compressor with a capacity of 550 c.f.m. It is driven by a Westinghouse 100-hp. induction motor. The hoist is a single-drum Lidgerwood electric unit with a speed of 235 f.p.m.

About a year ago the Loomis corporation installed entirely new packing facilities for its No. 2 mill at Fowler, and there are definite plans for carrying out a similar program for the No. 1 and No. 3 mills. Here again increased labor efficiency was the primary objective, for 16 men had been required on two shifts to pack the entire output of the three mills.

The No. 2 unit, the largest of the three mills, produces about 150 tons of finished product per 24-hour day. Under the old system 45 sacks were established as an hour's work, and four men could pack about 9 tons each in an 8-hour day. Quite often the packers were used for other work in the mill after they had completed their 9-ton stint. Since they were paid a time and one-half rate for this additional work, it was a rather expensive business all around.

With a Bates two-tube automatic packer a four-man crew is now packing the output of this mill at the rate of 9 t.p.h., with a reduction in labor force of two men per shift, or six man-days in 24 hours. One man operates the packer and three men load trucks off the belt conveyor which leads away from the packing machine. To relieve the tedium of operating the packer, the men spell one another off at one-hour intervals.

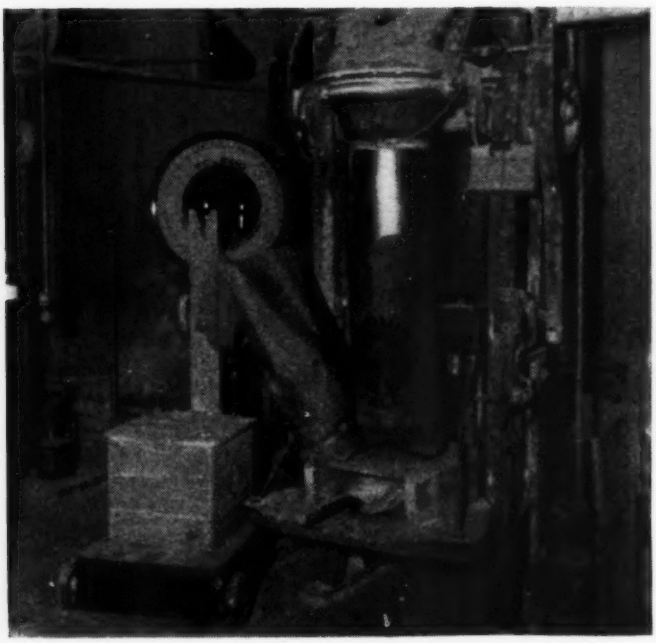
Since three distinctly different finished products are packed in this



• All potential sources of escaping dust in the new packing plant are hooked up to a new dust-collecting system. The recovered material is conveyed by screw to the feed tank.

• Left: On the old packing machine like this, one man packed nine tons in an 8-hour day.

• Below: Two men per shift have been eliminated in the No. 2 packing plant by the installation of this modern 2-tube packer. It has a capacity of 13 t.p.h.



plant, a somewhat elaborate storage and handling system is necessary. In the new packing plant the various finished grades of talc are stored in nine elevated garners which are set up in a straight line. A Fuller-Kinyon pump, operating on a track below the garners, feeds the materials to a 9-ton cylindrical cone-bottom bin above the packing machine. The pump, which has a capacity of 18 t.p.h., is also used for loading bulk products directly into box cars. Flow of the material from the feed tank to the packer is facilitated by means of a Syntron vibrator and a vane-type Fuller feeder. There are high and low alarm signals on the tank to prevent flooding by the pump.

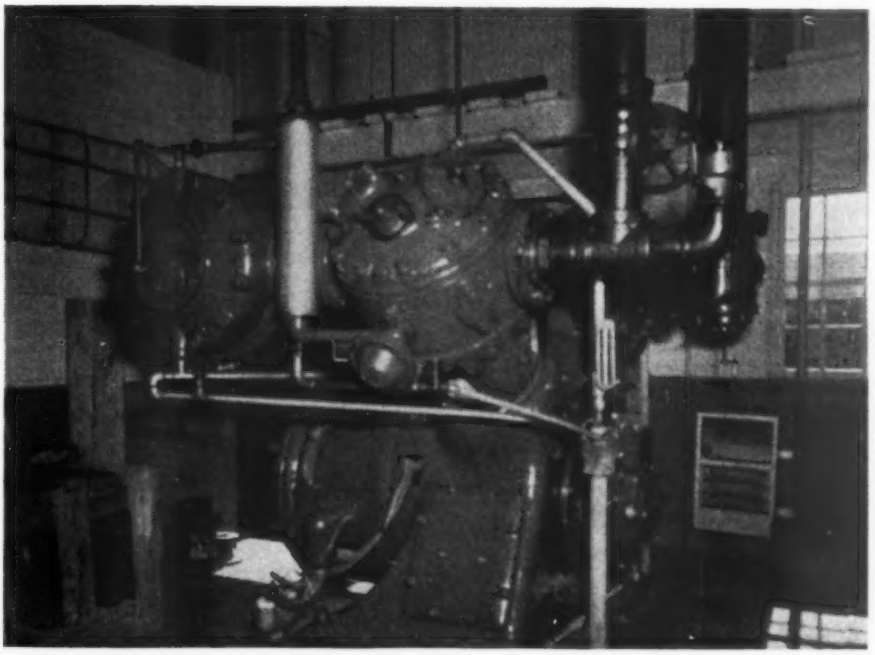
To control occupational dust hazards in the packing plant a Sly dust collector was installed over the packing machine. The ducts run to all points in the plant where dust is likely to escape. The recovered material is fed by screw conveyor to the feed tank above the packing machine. New York state inspectors checked the installation after the plant was in full operation and found the dust count to be negligible.

The packer is housed in a 25- by 25-ft. cinder block enclosure built within the original storage building. In addition to the packing machine, this structure houses the feed tank and the dust collector. The packing plant operates on a two-shift basis, bagging about 75 tons of material per shift, or about 9 t.p.h., although the plant has an actual capacity of 13 t.p.h.

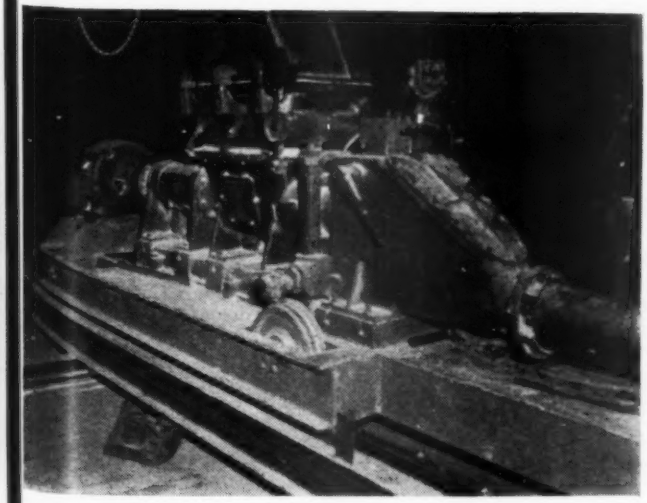
The No. 1 and No. 2 mills have not undergone any major changes

(Continued on page 83)

• A view of the No. 2 mill, in which improvements to the packing plant have been completed. This mill has a capacity of 150 tons in 24 hours.



• The 550 c.f.m. compressor, which supplies air for the No. 3 mine. It is driven by a 100-hp. induction motor.

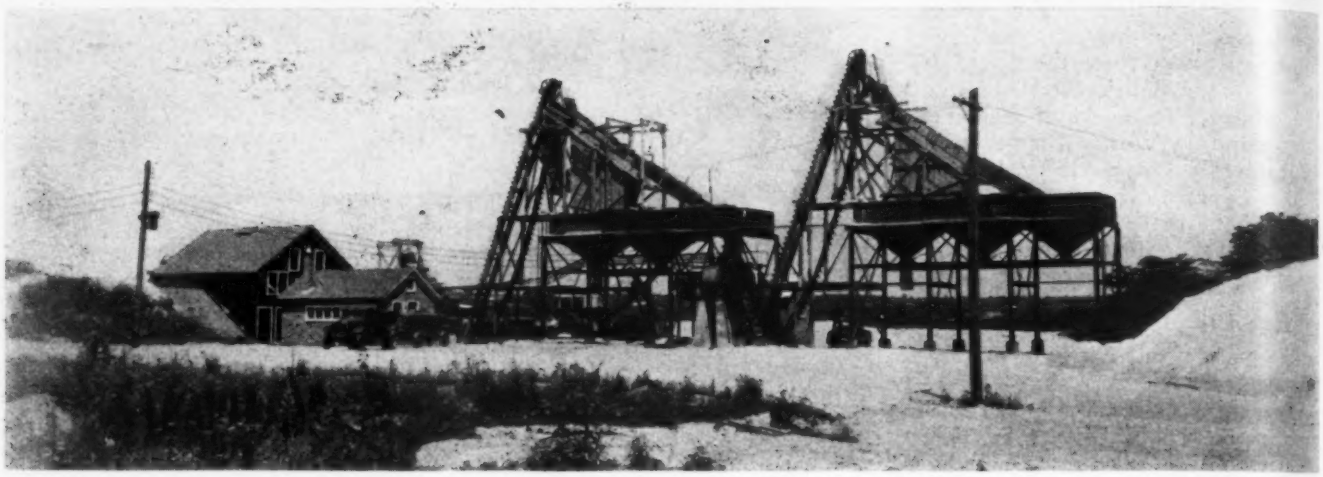


• Below, left: Finished materials are pumped from any one of nine garners (set up in a straight line) into the feed tank over the packing machine. The pump is mounted on rails under the garners.

• Right: A view of the double-deck vibrating screen used between the primary and secondary crushers in the new mill.

AGSTONE, NATURAL CEMENT PRODUCED BY SILICA SAND COMPANY

By ROBERT W. SPAKE



• Overall view of the agstone plant. Material from the quarry is dumped at the left, and agstone is stockpiled at the right. Five trucks may be loaded out at once.

another ON THE SPOT report

SINCE 1838 Utica natural cement and Utica bricklayers or mortar cement has been manufactured by the Utica Hydraulic Cement Co. at Utica, Ill. The raw material, natural cement rock, comes from a deposit underlying approximately 578 acres of company property—one of five such producing areas in the United States. This deposit consists of four strata, two of dolomitic limestone and two of natural cement stone. The top stratum of from 12 to 16 feet of dolomitic limestone, the second stratum of from seven to nine feet of natural cement stone, the third stratum of from 19 to 23 feet of dolomitic limestone and the fourth and last stratum of from 12 to 14 feet of natural cement stone. Until recently the cement stone from the upper stratum was mined by tunneling, using the room-and-pillar method, loaded by hand in 1½-ton cars and transported to the plant by small gasoline locomotives.

In 1946 The American Silica Sand Company, established producers of silica sand in Ottawa, Ill., purchased the assets of this plant, primarily with the thought of thus diversifying their activities. In testing the upper and third strata of this deposit, it was discovered that they were of a good commercial grade of limestone, suitable for the production of agricultural limestone and various sizes of crushed stone.

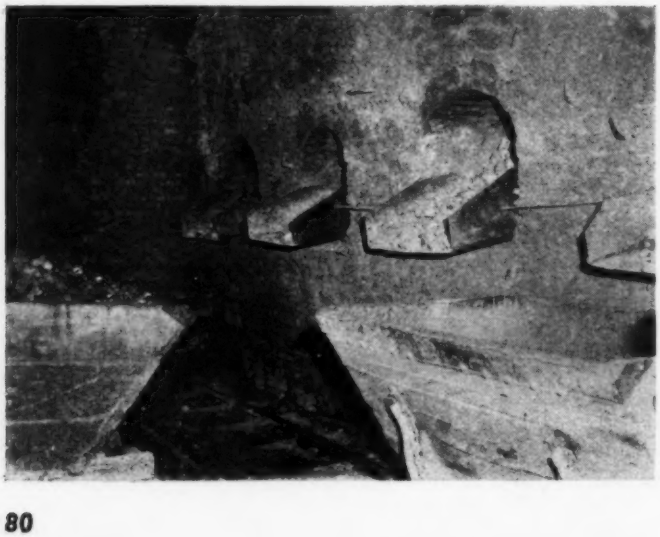
To take advantage of this, and to eliminate the necessity of working the narrow top seam of natural cement rock underground, Charles J. Niesen, president of the American Silica Sand Co., decided to install a new plant to produce crushed stone from the stratum, making road rock, agricultural limestone, various sizes of crushed stone, and two sizes of stone chips which would be used in laying asphalt or black-top roads. Operations to supply this new plant would lay bare the upper stratum of natural cement rock for open-quarry mining and obviate the tedious and more difficult and costly underground work. Thus, one quarry serves both the crushed stone plant and the rebuilt cement plant, a separate working level for each plant. The third and fourth levels can be used later if required.

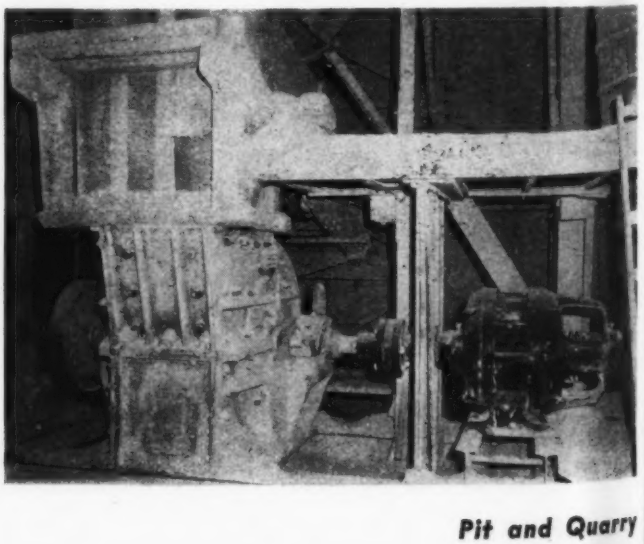
Agricultural Limestone Division

After approximately two to three feet of loose rock and soil overburden have been bulldozed from the top layer of rock, a Cleveland wagon drill, drawing air from a portable 315-cu. ft.-capacity Schramm diesel compressor, drills the top stratum of limestone to the top of the second stratum, the natural cement rock deposit. Then Dupont explosives are used to blast this top layer to

• Below, left: The "eyes" of the natural cement kilns. Burned rock is pulled from these openings by hand, and placed in the cars shown.

• Right: This hammermill is the primary crusher in the natural cement plant, receiving burned rock from the kilns.





• A 14-ft. air separator operates in closed circuit with the ball mills.

loading size, cleanly separating the top stratum of limestone and the stratum of natural cement stone.

The blasted stone is then loaded out by a 2-cu. yd. Marion diesel shovel into two KR-11 6½-cu. yd. International dump trucks for delivery to the crushing plant, a distance of approximately 500 feet. Each truck delivers from eight to ten loads per hour. The trucks drive up a short ramp of crushed stone, and dump onto an inclined grizzly, made of ¾-in. steel plate with 4-in. dry blanked circular holes, for delivery to the primary breaker. When the quarry stone is wet the grizzly is used to bypass minus-4-in. material. If quarry stone is dry, a plate is bolted over grizzly and all material is fed to the primary breaker.

The primary breaker is a Telsmith No. 7½ gyratory crusher with a 2½-in. closed side opening, driven through V-belts by a 50-hp General Electric slip-ring motor. This crusher discharges onto a 30-in. belt conveyor which also picks up the material by-passed through the grizzly when the stone is wet. This conveyor, driven by a 10-hp. Allis-Chalmers motor, utilizes New York conveyor belting on Stephens-Adamson troughing and return idlers. The head pulley of this conveyor is located beneath a Dings magnetic separator which removes any tramp iron that may have been introduced into the rock at the quarry.

The 30-in. conveyor discharges onto an inclined bar grizzly with 1¾-in. openings. Material passing over this grizzly is received by a small steel surge bin feeding a Telsmith gyratory reduction crusher with 1½-in. closed side opening. This crusher is driven through a flat belt drive by a 35-hp. G. E. slip-ring motor.

The by-passed stone and the crusher discharge are picked up from the hopper under the secondary reduction crusher, and fed by a short belt feeder to a Stephens-Adamson continuous bucket elevator. This elevator uses an 18-in. belt and 16-in. buckets, and is driven by V-belts and a 15-hp. Allis Chalmers induction motor.

The total input then passes over two Universal doubledeck vibrating screens, size 5- by 12-ft., where the minus ¾-in. (road rock) is removed and spouted to the first bin. If larger sized stone is required, the oversize, plus ¾-in. minus 2½-in., or any other size required, is taken off the lower deck of these screens and deposited in the second bin. The plus 2½-in., or if other sizes are

• Trucks dump over a grizzly into the primary gyratory in the agstone plant.

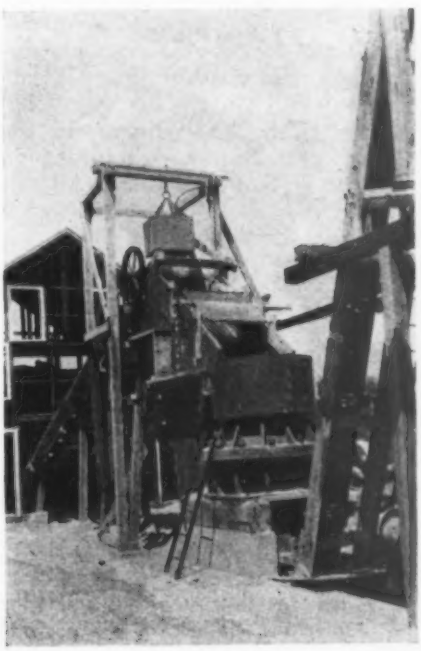
not required, the plus ¾-in., is deposited in a third bin which is a surge bin feeding two No. 424 Allis-Chalmers Pulverators. These reduce the limestone to agricultural stone and two sizes of chips—a cover coat and a seal coat for blacktop roads. One Pulverator is directly connected to a 125-hp. Crocker Wheeler motor and the second to a 125-hp. Westinghouse motor. Both motors are connected through compensators.

After passing through the Pulverators, the material is picked up by a second Stephens-Adamson continuous bucket elevator with 60-ft. centers, 18-in. belt and 16-in buckets, which is driven by V-belts and a 15-hp. Allis-Chalmers motor. This material then passes over two more Universal double-deck vibrating screens, and is spouted to three separate bins. One of these bins holds agricultural limestone (generally minus-4-mesh), a second, sealcoat material for bituminous asphalt roads (plus-4-mesh, minus-⅜-in.), the third, "cover coat" material for asphalt roads (plus-⅜, minus-⅝-in.). All of these materials are stored in various hoppers arranged in a line so that as many as five trucks can be loaded simultaneously. Loaded trucks are weighed out on a Fairbanks-Morse 40-ft., 30-ton, platform truck scale.

At present, construction is under way on a crushed stone and timber jetty in the adjacent Illinois River. This jetty will be used as a base for a 600-ft., 24-in. belt conveyor, which will permit direct loading of barges from the plant. Side openings will be cut in all bins and any one material, or a blend of several, can be directed into the barge. The advantages of water transportation which justify this installation are well known and need not be discussed here. There is a good market in this area for products such as those produced by this plant, and its capacity production 125 to 150 tons per hour is readily disposed of.

Hydraulic Cement Division

The cement plant is located approximately one-half mile from the quarry which serves both the crushed stone plant and the cement plant. Since its acquisition by the American Silica-Sand Co. it has been extensively remodeled and modernized. New modern equipment has been installed and an al-



• A magnetic separator removes tramp iron before quarried material gets to the secondary gyratory in the agstone operation.

tered flow sheet put into operation.

Where masonry or bricklayers' cement was formerly the principal product, "Utica Natural Cement" now constitutes a major part of the output of the plan. This is made from natural cement rock with the addition of material to retard the set, and is produced either with or without the addition of air-entraining agents.

This product is used for what is known as "Blended Cement Concrete", which is made by substituting natural cement for up to 25 percent of the portland cement in the mix. For example, in concrete containing 5 sacks of cement per yard, 4 sacks of portland cement and 1 sack of natural cement are used. Since 85 pounds of natural cement occupies the same absolute volume (1-cu.-ft.) as 94 pounds of portland cement, substitutions are usually made on that basis, resulting in the same yield of concrete.

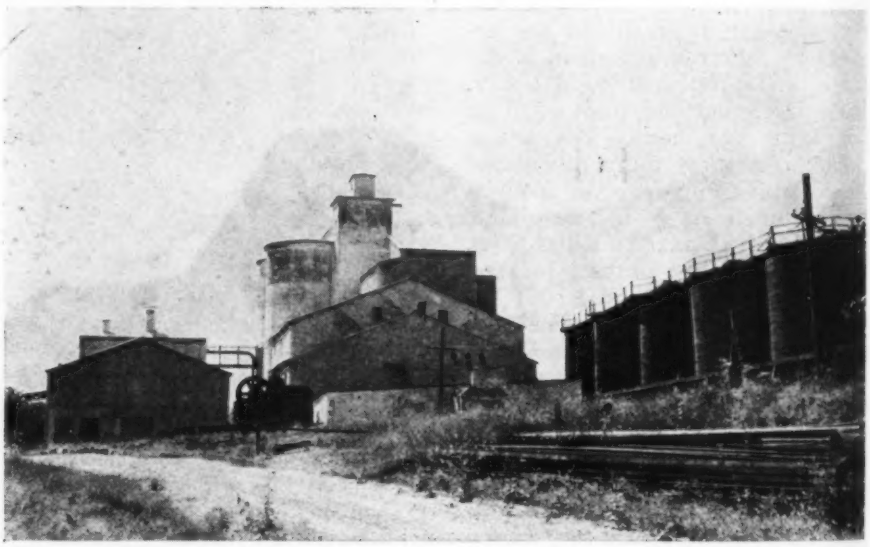
The advantages claimed for blended cement concrete are: greater workability; less segregation and bleeding; greater resistance to freezing and thawing, and to scaling caused by calcium chloride and salt applications. Natural cement is said to be virtually free from tricalcium compounds, and to have lower heat of hydration than portland cement. Blended cement concrete is said to be highly resistant to water penetration and to the corrosive action of sewage liquors.

Many state highway departments, including those of New York, Vermont, New Hampshire, Massachusetts, Maine, and Minnesota, have approved the use of blended cement concrete, and in some states its use is mandatory. The properties of blended cement concrete have influenced the Sanitary District of Chicago to require its use on all current work. Its use is made optional by the U. S. Army Engineers, the Civil Aeronautics Administration and the U. S. Public Roads Administration.

"Utica Bricklayer's Cement" is well known in the Middle West, for it was used in such important buildings as the Merchandise Mart, Tribune Tower, and the Civic Opera Building in Chicago; the Masonic Temple in Detroit; and the Oklahoma Club in Oklahoma City. A waterproofing admixture stops efflorescence, and shrinkage cracks are avoided by the comparatively slow rate of hardening of the mortar, which eventually becomes harder than the surrounding brick.

After the cement rock is blasted in the quarry, it is loaded with a 1½-cu. yd. Link-Belt shovel into narrow-gauge cars of green oak construction, each holding about 1½ tons of rock. Trains of 8 or 16 of these cars are hauled to the cement mill by one of three small gasoline locomotives. Two of these are Whitcomb 4½-ton models and one is an 8-ton Plymouth. At the plant,

• Charles J. Niesen, president, and Sidney G. Seaton, vice-president, in the laboratory of the Utica Hydraulic Cement Division.



• Pack house, grinding plant, and kilns of the cement plant. Storage silos are shown in the background.

• The upper level of the quarry serves the agstone plant; the lower level, the cement plant.

bituminous screenings are added to the load in each car, and cars are hoisted singly to the top of the vertical kilns by a "barney hoist" arrangement. Cars are spotted on tracks which encircle the tops of each of the five kilns and 8 cars constitute a "dump" in each kiln. As each car is dumped, the screenings fall into the kiln first, with the rock next, placing roughly half of the fuel charge below the cement rock. The other half of the fuel is placed on top of the rock, so that the kiln charge consists of alternate layers of rock and fuel.

As the burned product is drawn from the bottoms of the kilns, cement rock and fuel are dumped into the top to maintain approximately constant level. The kilns are drawn for 8 hours per day and the product of five kilns requires about 12 hours for complete processing and grinding. Natural draft maintains the fire in the kiln during the 16 hours when they are not being drawn. Additional bituminous screenings are added to the kilns each afternoon before the close of the regular 8-hour shift.

Properly-burned cement rock, unlike portland cement, is not a clinker. Rock that has gone to the point of incipient fusion is, in fact, unusable for cement purposes and is dumped on a waste pile at the plant. Insufficiently-burned rock, recognized by its difference in weight and color, is picked out and sent back to the kilns for reburning.

Rock is removed from the kilns by hand by men armed with iron hooks and asbestos gloves. Properly burned rock is chalky, soft, porous, and buff colored. This product is placed in cars with metal-lined bodies of green oak, holding approximately 1 ton each, and these are pushed down a short spur track to a Stephens-Adamson pan conveyor. The side-dump cars are discharged directly onto this conveyor, which runs below track level for a short distance at the start of its travel. Gypsum, in weighed quantities, is added at this point, as is the stearate base admixture when required by the type of cement being manufactured.

The pan conveyor carries the materials up and into the top of a 20-ton bin in the grinding building. A short belt conveyor with a Stearns magnetic head pulley feeds the burned cement rock from this bin into the primary crusher, a Gruendler 5XA hammermill. This mill is powered by a 75-hp. Allis-Chalmers slip-ring motor and reduces the kiln product to minus-10-mesh size. The fine material is discharged from the hammermill into the boot of a totally-enclosed Stephens-Adamson bucket elevator, and is carried up and into a 1500-bbl. storage bin.

Two double-flight screw conveyors feed the pulverized material from the bottom of this bin to another completely-enclosed bucket elevator. The speed of the conveyors is controlled by a Reeves variable-speed pulley, and by the use of this device the tonnage of crushed material moved can be accurately controlled. The next step in the flow sheet is one of two 30-ton bins, which actually are surge hoppers feeding two F. L. Smidth 5- by 26-ft. ball mills through two conventional screw conveyor feeders. Each of these mills is driven by a 220-hp. G. E. synchronous motor. Both motors are located in an adjacent room of the plant and deliver their power through long shafts and clutches. The motors are controlled by means of Westinghouse switchgear on a Marquette Electric Switchboard Co. panel. The mills, charged with steel balls, are the fine-grinding units and operate in closed circuit with a 14-ft. Sturtevant air separator. The separator is adjusted to allow material which is approximately 98 percent minus 200 mesh to pass into storage, and to return coarser material to the system for further grinding. The plant is not at present operating on a 24-hour basis, but if five kilns are in operation the company operates with two tube mills for eight hours, or one tube mill for 16 hours, to obtain sufficient grinding capacity to take the products (drawings) from the five kilns. The finished product has a specific surface area in excess of 2,200 sq. cm. per gm.

This product falls by gravity into the boot of a completely-enclosed Stephens-Adamson bucket elevator on 85-ft. centers. This discharges into a hopper over a system of screw conveyors from which the cement is spouted into any one of four concrete silos or their interstice. A storage capacity of approximately 40,000 barrels* is afforded by this structure, which is of conventional cement plant design.

Nine openings in the bottom of each storage bin feed by gravity into screw conveyors which deliver cement to a cross-conveyor passing through a tunnel beneath a railroad spur to the packhouse. Less difficulty is encountered with packing or bridging in the silos than is the case with portland cement. An iron rod inserted in the silo opening, or a small jet of air injected into the packed cement, will usually start the material flowing freely. In the packhouse, a bucket elevator delivers the cement to the bins of two 3-tube St. Regis packing machines. Jaite or St. Regis paper bags are used to pack masonry cement in 70-lb. bags and natural cement in 80-, 85-, or 94-lb. bags. Natural cement is also shipped in bulk and in this case the packing machines are by-passed and the cement is delivered through a flexible spout to covered hopper cars.

Sacked cement is delivered from the packers to a belt conveyor which conveys the bags to box cars spotted at the loading dock. The bags are then trucked by hand in the cars in the usual manner.

A Sly dust collector installed in the packhouse serves that unit as well as the grinding room and the silos.

The capacity of the plant at present is approximately 300,000 barrels per year which can be increased by the addition of more kilns.

*There are 340-lbs. in a bbl. of natural cement.

Loomis Talc

(From page 79)

since they were built. The company's No. 3 mill, which was built in 1940, will when completed have two production lines, with a total capacity of 150 tons per day. At the present time only one line is in operation and output averages around 45 tons per day. In this mill the run-of-the-mine material is fed initially to a Universal 10- by 24-in. jaw crusher, elevated, screened over a 2-deck Tyler vibrating screen and recrushed in an Allis-Chalmers Type R reduction crusher. The secondary crusher is in closed circuit with the screen. Minus ¼-in. material is removed from the circuit and fed to an 8-ft. diam. by 7-ft. long Hardinge pebble mill, where the finish grinding is carried out in closed circuit with a 14-ft. Gayco centrifugal air separator. The finished material averages 99.25 percent through a 325-mesh screen, which is about standard for all the Loomis products. Obviously this is a measure of the coarseness of the product rather than of its fineness. Mechanization of the three mine properties has stepped up their output considerably, and it is felt that the present facilities will be adequate even when the full grinding capacity of the No. 3 mill has been developed. Additional labor economies will, of course, result when modern handling and packing equipment has been installed in the No. 1 and No. 3 mills.

Record of National Lime Assn. Shows Valuable Service Rendered to Industry

ONE of the first trade associations to be organized in the field of nonmetallic minerals in the United States was the Lime Manufacturers Assn. Back in 1903 a group of progressive lime manufacturers decided they could accomplish more and strengthen the position of lime in the business world through joint, concerted action. Of the original founders only one man, Charles L. Warner, still active as president of the Warner Company of Philadelphia, is now alive. In 1922 the Lime Manufacturers Assn. was incorporated and its name was changed to the National Lime Association. As a result, the National Lime Association and its predecessor have been in continuous existence from 1903 to the present time, weathering three depressions and two world wars.

Field The National Lime Assn. is the only national organization that embraces burned lime products. This includes all forms of quick and hydrated lime, high calcium and high magnesium (dolomitic), except clinker or dead-burned dolomite. It also covers the use of all these products in the construction, agricultural, and chemical or industrial fields.

The character of the uses of lime has drastically changed since the inception of N.L.A. In 1925 about 65 percent of the lime produced and sold was used in construction and agriculture, with the balance being consumed in industry. According to the U. S. Bureau of Mines, in 1945 only about 19 percent of lime was consumed in construction and agriculture, the balance being chemical or industrial. Thus, lime today is regarded more as a basic chemical than as a building or agricultural material. In keeping pace with the changing markets for lime, the association is concentrating its efforts more and more on the expanding chemical uses for lime.

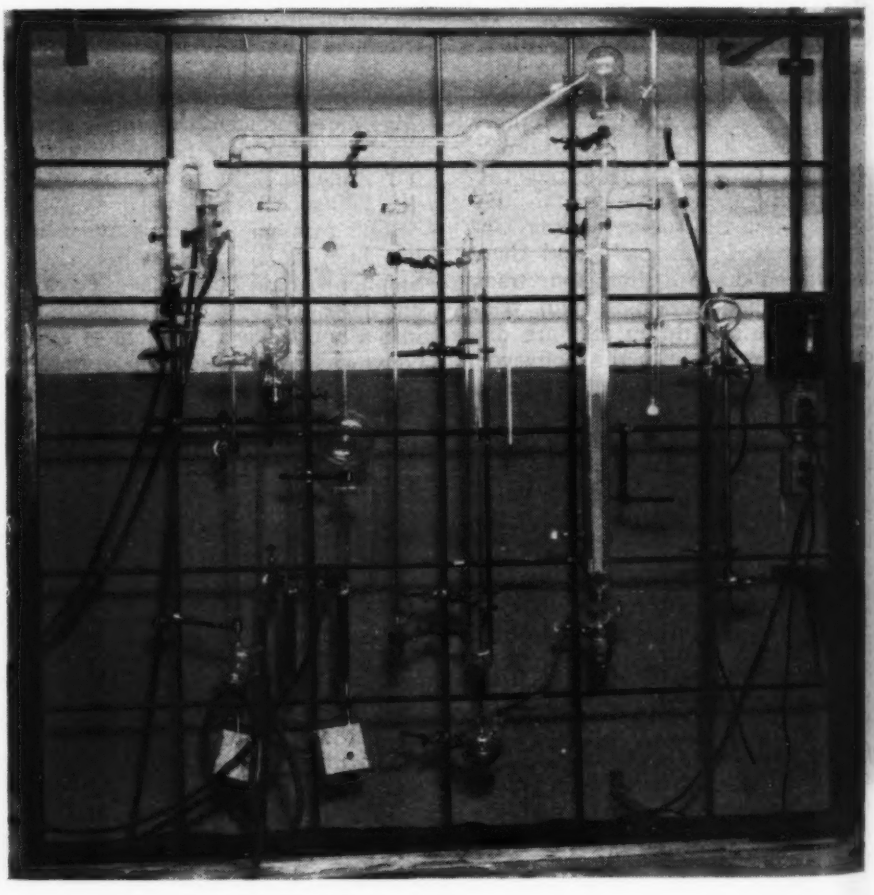
Membership The present members of the association are producers who manufacture and sell lime products on the open market. The membership is comprised of a sizable number of both large and small producers, representing over half of the tonnage strength of the industry. That the membership is truly national in scope is evidenced by the following list of states in which member plants are located: Washington, California, Nevada, Texas, Minnesota, Michigan, Wisconsin, Missouri, Illinois, Tennessee, Alabama, Florida, Virginia, West Virginia, Ohio, Pennsylvania, Maryland, New York, Massachusetts, Connecticut, Vermont, and Canada.

Meetings The membership formulates and directs association policies and activities through the medium of a board of directors. Members of this latter group are elected each year by the membership on a geographical basis in which the country is subdivided into 15 districts. Each district is entitled to at least one director. The directors meet generally once in the fall or winter, and at the time of the annual convention. Special and standing committees selected by the board work independently on specialized problems and programs. Typical of these committees are the Technical Committee, Mortars and Masonry Research Committee, Agricultural Research Committee, etc.

This spring, at The Homestead, Hot Springs, Va., the National Lime Assn. enjoyed its 45th Annual Meeting. The annual convention has been practically a regular occurrence since about 1903. For the past few years, the total registration for the meeting has averaged from 100 to 125 people, representing segments from all parts of the country and Canada. A diversified program is prepared covering all phases of the lime industry—manufacturing, marketing and research. In recent years, an increasing number of wives of lime manufacturers have accompanied their husbands to the association's conventions, giving the whole affair a social touch as well.

Staff The association has for many years maintained its offices in Washington, D. C. The affairs and activities of the association are handled by a paid staff under the di-

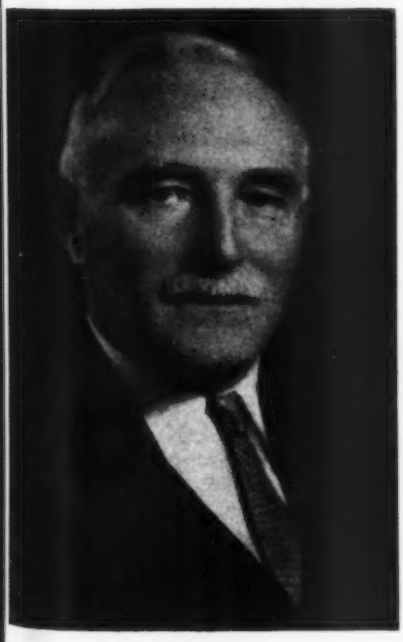
• A view in the Massachusetts Institute of Technology laboratory, showing equipment used for the determination of surface area by the nitrogen adsorption method.



rection of a general manager. Other officers are a secretary, a treasurer, and an assistant secretary.

Operating Division The newest activity of the National Lime Assn. is the formation of an Operating Division in which operating men from member companies meet periodically to discuss production problems. This activity has proved to be exceptionally popular, since it is the most concrete way for lime producers to learn how to operate their plants at maximum efficiency. The idea was first conceived in 1945, when lime companies found themselves confronted with steadily increasing costs and at the same time were unable to obtain price relief from OPA. The only alternative for a profitable operation was to discover ways of reducing production costs. The feeling was that in meeting together and discussing common problems, it would be possible for those attending to take away new cost-saving ideas. Judging from the enthusiasm and large attendance at recent meetings, this seems to have been the case. Over 100 men attended the meeting in Hershey, Pa., in November, 1946.

Research At the present time the association is spending more money for research than it has in many years. The main purpose behind this research is two-fold—first, to solidify the position of lime in present uses by improving its application and utility and, second, to expand present markets and develop new uses.



Dr. Willem Rudolfs
Chairman, Department of Sanitation, Rutgers University, New Brunswick, N. J.

Present research includes a long-range program at Rutgers University under Dr. Willem Rudolfs, chairman of the Department of Sanitation, on industrial trade waste treatment. Due to the widespread agitation against stream pollution, thousands of industrial plants will be required to treat their wastes in the next ten years. The main purpose behind this work is to develop the use of lime in the treatment of those industrial wastes which require chemical treatment. The association is at the end of the first year in a five-year research program on a fundamental study of lime at Massachusetts Institute of Technology. While lime is one of the oldest materials known to man, there is, paradoxically, much to learn about the properties of lime—why two limes of identical physical and chemical properties react differently in the many uses of lime, etc. This research should be valuable to both producers and consumers of lime, and it is possible that some revolutionary facts may develop from this work which will have a profound effect on applied research in stimulating new markets.

The association is in the midst of a four-year program on agricultural liming at five state agricultural experiment stations in Ohio, New York, Pennsylvania, New Jersey, and Maryland. This program covers relative tests on the various liming materials under varied conditions. At the same time a research fellowship is continuing at the national Bureau of Standards on building lime.

As a result of market research being conducted by the Technical Committee of the association and the association staff, these research programs may be supplemented or modified as the need warrants.

Literature While the big war and postwar demand has minimized the need for vigorous promotion of lime, the association, nevertheless, continues to answer thousands of inquiries concerning lime and its uses each year by letter and through various association literature and technical bulletins. Quantity lots of literature have been supplied to many of the post-war apprentice-training programs in the agricultural and construction fields. The association is now in the process of distributing the sixth edition of its 211-page booklet *Water Supply and Treatment,* which is being used along with *Principles of Sewage Treatment* by several colleges as their standard textbooks for engineering students studying water and sewage plant practices. Thousands of these books have been distributed, until now they are used widely as reference manuals by water and sewage engineers. Quantities of association literature are also distributed by member companies, which, combined with the efforts of the association office itself, educates the public on lime.

In normal times the association has done trade journal advertising and sponsored direct-mail campaigns with sales leaflets on various uses of lime. Periodically it releases information to trade journals on new lime applications or educational information from reports gathered in the field or facts developed from research which are of interest and help to actual and prospective lime consumers. Reprints of a technical and sales nature are collected and often distributed for publicity and educational purposes. In the building field, in particular, specifications on lime and its use in mortar and plaster are promoted. Government agencies which either use or are interested in lime are contacted regarding new data.

The association does market research work constantly by personal contact with consuming industries and by following the pertinent trade and technical journals for any new developments in the various uses and applications of lime. Any new developments in lime markets, pro and con, as well as general matters affecting the lime industry, and a

R. S. Boynton
General manager and treasurer, National Lime Association

safety news letter, are relayed to member companies each month in a publication or house organ, called *Limeographs*. This publication or a Monthly Letter has been distributed for 22 years and, together with

Mrs. Roma M. Turpen
Secretary and assistant treasurer, National Lime Association

its annual index, is used by many companies for permanent reference purposes.

Equipment Service All through World War II and up to the present time the association has circulated an Equipment and Parts List on used surplus equipment owned by lime manufacturers. With the association acting as the clearing house, many sales have been made of this surplus equipment which, in its small way, has contributed to the current production achievement of the industry. Otherwise, endless delays and "red tape" would have been forced upon the lime companies before the scarce equipment could be obtained.

Statistics On statistics, the association covers the whole industry, and any company that cooperates by supplying needed information is furnished consolidated reports by districts on lime shipments, broken down into its three basic fields—chemical, construction, and agricultural. The association sponsors an Annual Safety Competition for the industry which is conducted by the U. S. Bureau of Mines and publishes a monthly consolidated Accident Experience Report for those plants entered in the yearly contest. The figures on safety and shipments are the only monthly figures available to the industry since the Bureau of Mines publishes statistics on lime tonnages and accident experience on an annual basis only.

Industry Representation During World War II the strategic location of the association's offices in Washington, D. C., was more apparent than ever before. As was the case with nearly all trade associations, the newly organized war agencies depended on them for accurate, unbiased information about their products. The National Lime Assn. was no exception in this respect. Government personnel in agencies like OPA, WPB, etc., who were responsible for matters pertaining to lime, were literally educated on lime and constantly kept abreast of all developments affecting their particular work. In return for this service, government agencies generally cooperated by informing the association of new war regulations and orders with respect to their intricacies. This permitted a clear understanding and enabled the N.L.A. to advise the lime industry on what was occurring and how the industry and individual companies could cut "red tape" and expedite their affairs. By submitting statistics and information the association was successful in increasing the priority ratings of the industry on various equipment and, finally, manpower. Also, in facilitating the flow of lime to war industry, it helped to forestall allocation by WPB.

Through group action several dangerous pitfalls were averted with OPA. On July 1, 1946, all of the

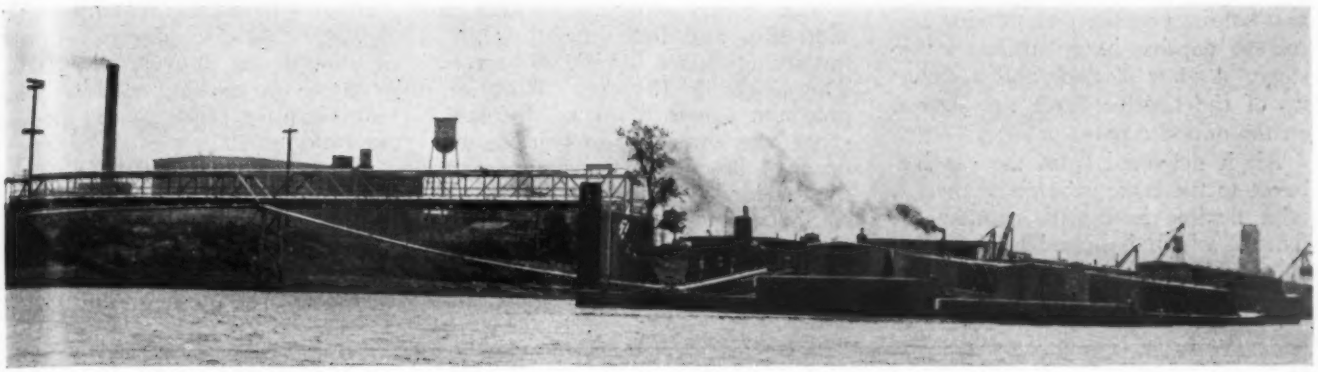
H. R. Staley
Associate professor of building construction, Massachusetts Institute of Technology

industry except plants on the West Coast through association efforts obtained from OPA a badly needed $1.00 per ton price increase on lime. Relief for the West Coast was finally obtained in the fall. The association also helped to exempt lime from renegotiation. With the numerous emergencies in the postwar era the association continues to play a very active part on government matters affecting the lime industry.

With the advent of World War II, the association for the first time became an actual Washington contact office for those members availing themselves of this service in expediting individual company affairs. By obtaining priority assistance from government agencies, obtaining government help in emergencies, and following applications through to issuance, etc., the cost and time of trips to Washington was saved. In the event members are obliged to come to Washington, the association offices serve as a convenient headquarters with desk, phone, and typing facilities available. In summation, while the association was not always successful in expediting government matters, it was of real help to members and the industry, as a whole, on many occasions. In all probability this government service will still be needed in years to come. The association urges its members to avail themselves fully of the varied services offered and consider the association office as their own.

Local Lime Associations At the present time, there are only three local lime associations that are active. One of these, probably the largest of these associations, is the Quality Lime Institute, with headquarters in Philadelphia, Pa. This organization is composed entirely of lime manufacturers on the Atlantic seaboard in the states of Pennsylvania and Maryland. Their organization is designed entirely to promote burned lime and finely pulverized limestone in the agricultural field. In Ohio there exists a local association called the Finishing Lime Association of Ohio, with headquarters in Toledo. The membership of this organization is composed of a portion of the finishing lime manufacturers located in northwestern Ohio. This organization is primarily concerned with promotion of finishing lime in construction. Southern lime manufacturers also meet regularly every month or two in such places at Atlanta, Knoxville, or Birmingham to discuss generally their local problems. This organization is called the Southeastern Lime Institute, Inc., but does not have any paid officers. None of these local associations is actually affiliated with National Lime Assn., but many of the members in these organizations also maintain membership in the N.L.A.

MISSOURI PORTLAND CEMENT CO. OPERATES ENLARGED TERMINAL AT MEMPHIS, TENN.



• A view of the Missouri Portland Cement Company's dock on the Wolf River at Memphis, Tenn.

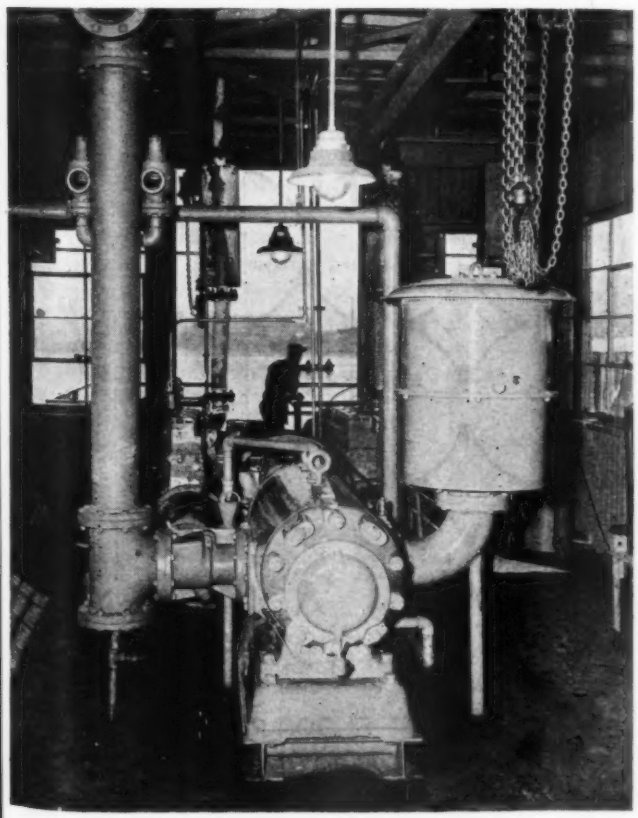
THE "American Way" of providing customers with the best possible service has resulted in the building by the Missouri Portland Cement Company of an outstanding cement terminal at Memphis, Tennessee.

The plant, consisting of dock, silos and packing house, is located on the Wolf River, which is a protected still-water forming the Memphis waterfront. In addition to water transportation, both the Illinois Central and Missouri Pacific Railroads serve the property, which makes it a versatile distribution center.

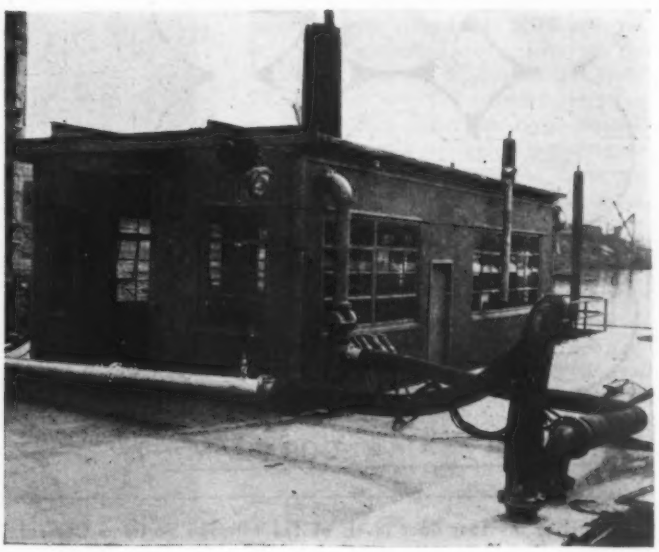
Operations at the plant involve the unloading of cargo barges, storing, packing and shipping of cement, also the handling and storing of paper bags, as well as cleaning, mending and tying of returned cloth sacks.

By WALTER C. MUELLER
Supervisory Engineer
Missouri Portland Cement Co.

Bulk cement is brought to the plant by seven cargo barges, each with a capacity of 8,000 barrels. These barges are loaded at the Missouri Portland Cement Company's St. Louis dock on the Mississippi River, and are towed to Memphis 2 or 3 at a time by tugs of the Marquette Transportation Company, making a round trip in 8 or 9 days. These barges are known as "self unloading type" because they are equipped with the necessary facilities to discharge their own cargo. A unique feature of the barge design is the hopper bottom which allows all material to flow into the path of a Sauerman drag bucket, thus simplifying the unloading operation. The drag, cable drawn, delivers the material into a hopper over an 8-in. Fuller-Kinyon type "H" stationary pump, which has a pumping rate of 350 barrels per hour through an 8-in. pipe line, 1,000 feet long. Air for this pump is supplied from the captive barge by a Fuller rotary air compressor delivering 1,600 c.f.m. at 30 pounds pressure. This compressor is driven by two Cummins diesel engines operating at 1,500



• Left: The rotary air compressor on the captive barge supplies air for the pump; it is driven by two 180-hp. diesel engines operating at 1,500 r.p.m. • Below: The compressor house on the barge which is secured to the dock. Note the air line leading from the compressor in the house to the pump on the barge, also the flexible hose connecting the pump and the conveying pipeline.



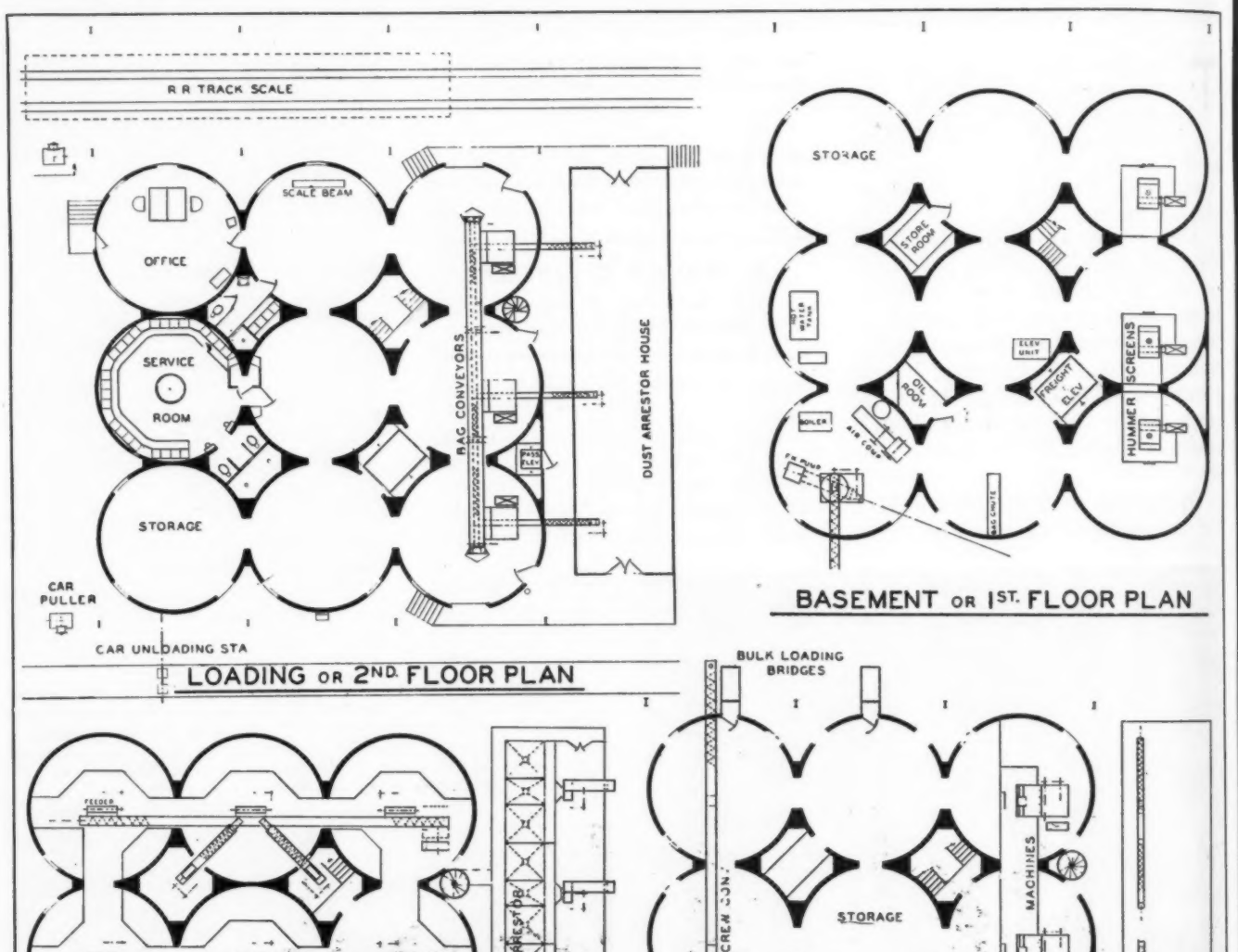
r.p.m., and developing 180 h.p.

The dock consists of a two-span bridge which provides a means of supporting the pipe lines, power cables and walkway from the high bank to the river pier. Stairways and landings on the pier provide access to captive barge at any river stage. A view of dock and a close-up of the captive barge are shown on the opposite page.

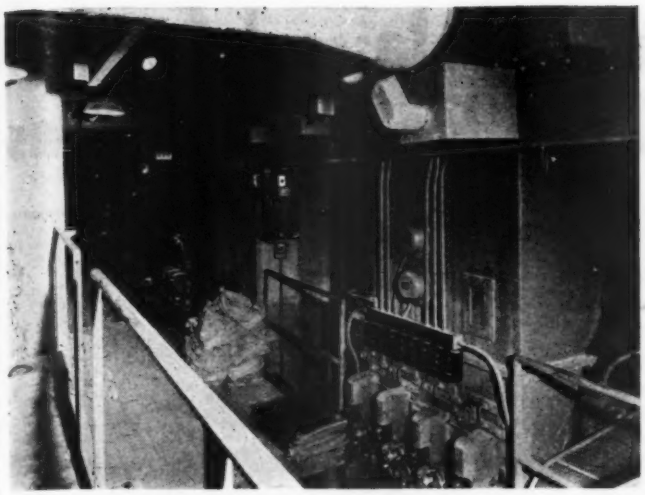
Air is delivered from the captive barge to the cement barge by means of a flexible hose with companion flanges, which is bolted to a fitting on the cement barge. Electricity for various uses, lights, etc., for the cement barge comes from the shore by cables with special multi-plug connections. Cement leaves the barge through a second flexible rubber hose, and enters the 1,000-ft. pipeline to the storage plant.

The storage structure consists of nine silos and four interstices and has storage space for 90,000 barrels. The height is 131 feet. However, only the upper 85 feet is storage space, the lower 46 feet being made up of 4 floors which accommodate the packing and bag departments. A Shepard elevator provides transportation to the roof of the silos, which makes the height no inconvenience when silo inventory, inspection or valve changing is required. A unique feature of the silos are the steel conical bottoms, each of which has an individual St. Regis rotary feeder, a combination which completely empties the silo without manual assistance. The height of these silo discharges makes it possible to convey material directly to the packing machines without elevating, thus aiding packing operation.

The packing department consists of 3 packing units with independent equipment to prevent contamination, and located conveniently on 4 floor levels, which, as stated, are below the silo storage. The flow of



• Layouts of the four floor levels of The Missouri Portland Cement Company's Memphis facilities. These are located below the silo storage.



• The four-tube packing machines, operated by push buttons, have a capacity of 300 bbl. per hour.

• Right: A view of the storage structure, composed of nine silos and having a capacity of 90,000 bbl. The bottom part of the building is occupied by the packing and bag departments.

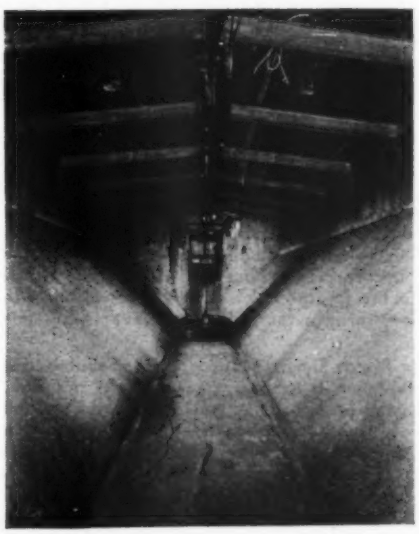
material is directly from the silos to the packing bin, where Bin-Dicators automatically control the feed. The St. Regis packing machines are of the modern 4-tube type which have a capacity of 300 barrels per hour. Push buttons are located on front of the machines which allow the operator to control all equipment of the unit from this station. A view of these machines, and the operator's platform is shown above. Each piece of equipment is connected to a Sly automatic dust arrestor. Dust from this arrestor, as well as spill from the packing machines and belt conveyor, is collected by means of 9-in. screw conveyors, then screened by a Tyler 3-ft. by 5-ft. Hum-mer. After this operation it is elevated by a 10-in. by 6-in. bucket elevator, and returned again to the packing bin.

Bulk loading is accomplished by means of spouts and a hose connected directly to the hoppers of the silos adjacent to the loading tracks. A rotary valve is used to control the flow. Bulk may also be loaded by screw conveyors to cars located on the track scale.

The bag department makes use of available space in the basement of the silos for the storage of paper bags, which are received directly from box cars by chute. They are taken as required to the packing floor on four-wheel floor trucks, and a 3,000 pound rotary lift freight elevator. Returned cloth sacks are received from delivery trucks, loaded on floor trucks, and taken to the packing floor where the cloth sack department is located. These sacks are cleaned by means of a suction pipe cleaner connected to a dust arrestor identical with the one serving the packing units. Sorting is done during cleaning, to determine if mending is required. Good bags are taken directly to a St. Regis automatic tying machine, and are then ready for re-use.

Service facilities which are located on loading floor provide well ventilated locker rooms with tile-lined shower stalls and service rooms. The office is located on the same floor making use of one silo space.

The efficient arrangement of equipment and storage space used by packing, bag and service departments on the four floor levels directly below the silo storage is evidence of careful designing by the company's engineering department, which designed the plant and supervised its construction.



• An interesting study in perspective: the hopper bottom of the barge, in which the drag bucket is operated.

U. S. Slate Production Climbs In Quantity and Value

Paralleling the high level of private residential construction and a record private nonresidential building program, sales of slate in 1946 totaled 759,770 short tons, valued at $8,844,106, according to figures compiled by the U. S. Bureau of Mines. 1946 production was 4 percent higher in quantity than the former peak of 727,700 tons in 1924. Compared with 1945 figures (551,890 tons, valued at $5,658,913), total sales in 1946 increased 38 percent in quantity and 56 percent in value.

Sales of slate granules and flour in 1946 were the highest on record, rising to 663,520 short tons, valued at $5,424,-604, or 38 percent higher in quantity and 47 percent higher in value than in 1945. The average value of granules in 1936 rose 64 cents per ton and that of flour 22 cents per ton, as compared with prices current in 1945.

Output of Roofing Granules Reaches Top Mark in 1946

The production of roofing granules established a record of 1,380,560 tons in 1946, according to reports of producers to the U. S. Bureau of Mines. The tonnage was 32 percent greater than in 1945. The boom in new construction and repair of run-down property during the last year combined to increase the demand for granule-coated asphalt roofing and siding to the highest levels on record.

Relief of the wartime shortages of pigments and other raw materials benefited the artificially-colored types, but the demand for natural granules also was high. The output of artificially-colored granules increased 40 percent and that of the natural granules 26 percent. In value, the artificially-colored types increased from $14.52 per ton in 1945 to $14.74 in 1946; natural types from $7.39 per ton to $7.75 per ton.

Many Benefits Found in Delayed Action Blasts at New York Trap Rock Quarries

another ON THE SPOT report

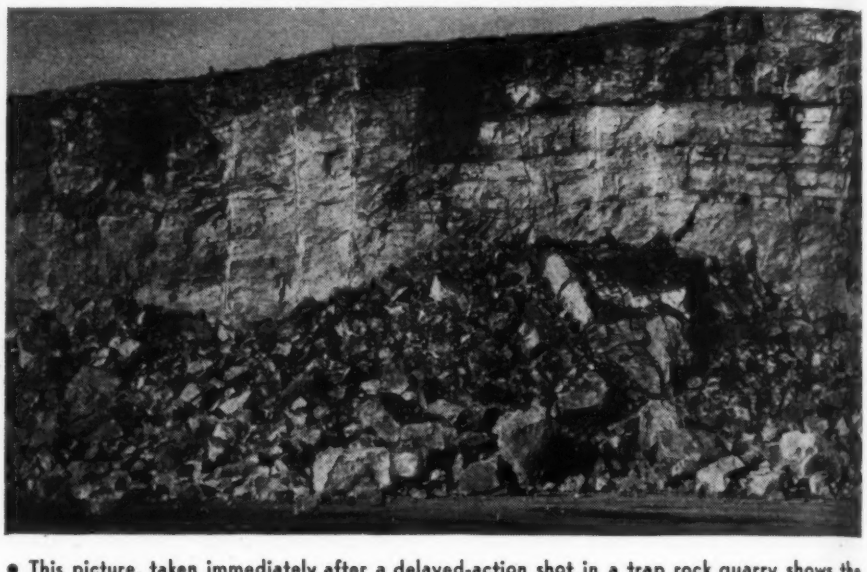
AT the 30th annual convention of the National Crushed Stone Association held in Chicago last January, Lou F. Miller of the New York Trap Rock Corp., and Dr. L. Don Leet of the Harvard University Seismograph Station, were teamed

By WILLIAM M. AVERY

together in a discussion of delayed-action shooting. Their discussions and demonstrations, which we thought at the time marked the high spot of the entire three-day meeting, were reported in some detail in our review of the convention. (See PIT AND QUARRY, February, 1947, page 76.)

In Mr. Miller's portion of the discussion he demonstrated a delayed-action blasting switch which he had developed in connection with New York Trap Rock's concerted effort to eliminate complaints and occasional law suits resulting from blasting operations at the company's quarries. Because of the wide prevalence of this problem among quarry operators, we felt that the subject merited more detailed attention than was possible in a routine convention report. Accordingly we requested and received the company's permission to call on Lou Miller at Newburgh, N. Y.

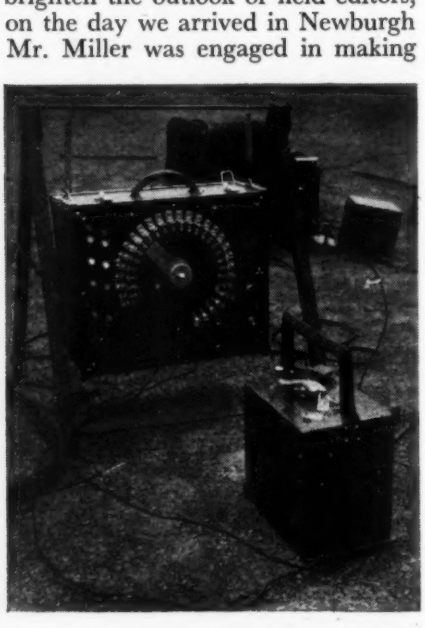
By one of those lucky coincidences which all-too-infrequently brighten the outlook of field editors, on the day we arrived in Newburgh Mr. Miller was engaged in making some test shots at the company's Stoneco quarry, just across the Hudson from Newburgh. Thus we not only got to spend a full day with one of the most genial and courteous men in the stone business, but we were permitted to see the blasting switch put through its paces a number of times.



• This picture, taken immediately after a delayed-action shot in a trap rock quarry shows the excellent breakage obtained. With the new technique the company is now working sections of bank that were formerly regarded as unworkable.

His company became interested in the possibilities of delayed-action shooting, Mr. Miller told us, when vibration studies at several of its quarries completely verified the Bureau of Mines' theory that earth movement (or vibration) is in direct proportion to the amount of explosive used. It seemed plausible that if each hole in a blast were fired separately, the vibration should not exceed that produced by the hole containing the maximum amount of explosives. Initial tests, carried out in July, 1946, at Stoneco, were limited to 4-hole shots using a delay of about one-fiftieth of a second between holes. The primary objective of the tests was to determine if vibration could be reduced without any material loss in the efficiency of the blast.

Right from the start it was found that vibration is a neglibile factor in delayed-action shots, and all subsequent experiments have been concentrated on the problem of securing better breakage. It is actually in this field of endeavor that the delayed-action technique is most impressive. In making this statement there is no thought of minimizing the importance of reducing vibration. But this is distinctly a negative, non-creative function; it eliminates a source of annoyance, which is at best an intangible benefit and hardly susceptible to measurement. The secondary and unsought benefits of delayed-action shooting are the ones that will appeal most to quarry operators—the excellent breakage ob-



• Left: A view of the delayed-action blasting switch developed by Lou Miller of the New York Trap Rock Corp. The drum switch in the foreground is a safety provision, with settings for "off", "run" and "fire".

• Right: Simultaneous vibration readings are taken on these two machines. At the right is the Leet 3-component seismograph; at the left, the Cambridge vertical-component vibrograph. Although the larger machine is necessary for complete studies, the vertical-component machine is frequently adequate for comparative studies.

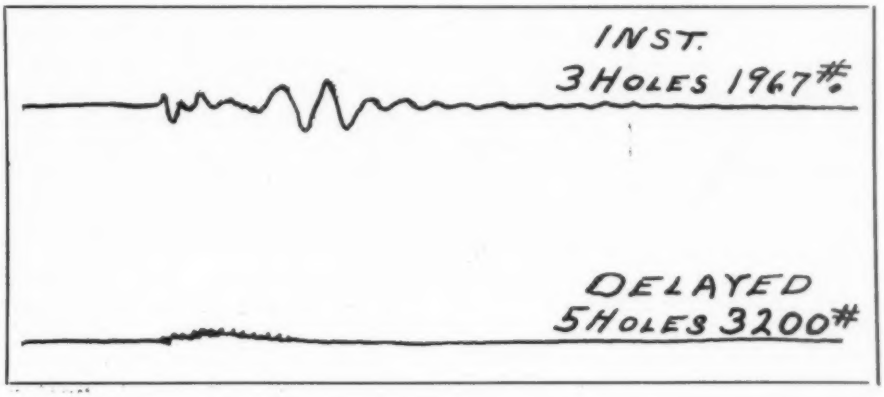
tained (and the corresponding reduction in secondary blasting), the ability to shoot more holes and more widely spaced holes in a single blast, the reduction of back break and the maintenance of cleaner, straighter quarry faces.

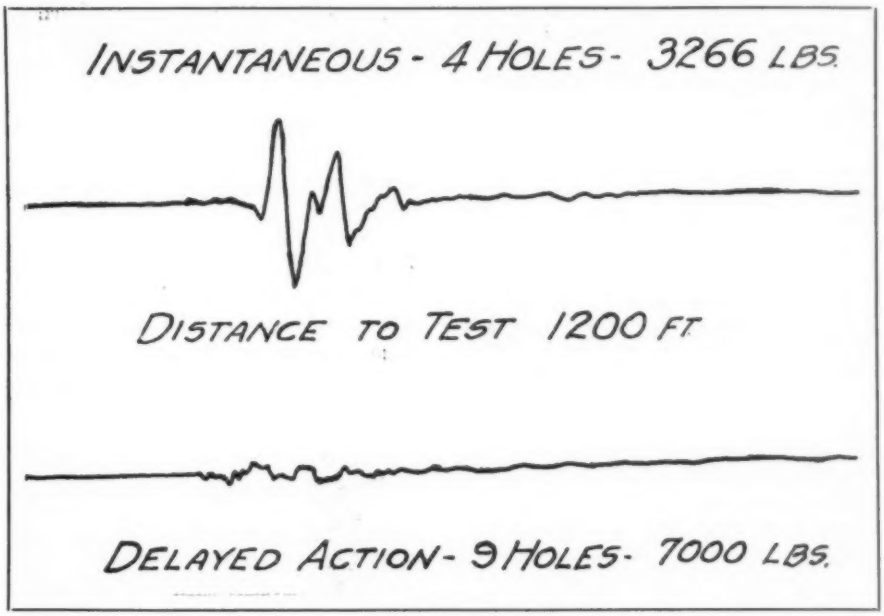
To date New York Trap Rock has made many large multiple hole blasts at the Stoneco, Haverstraw and Tompkins Cove quarries. In each of these shots excellent breakage was obtained, and secondary shooting was reduced to the minimum. There was almost no back break and the general appearance of the banks showed a distinct improvement at all three locations. There were no vibration complaints as a result of these blasts, although in each instance far more explosive was used than had ever been considered practical in instantaneous shots. At Haverstraw it had been the practice to use a spacing of 20 feet between holes in instantaneous shots. Even with a 26-foot spacing on delayed-action shots the company has found that there is a tendency to break the stone too fine, and there is a distinct possibility that the spacing will be increased to 30 feet. This obviously will mean an important reduction in drilling costs.

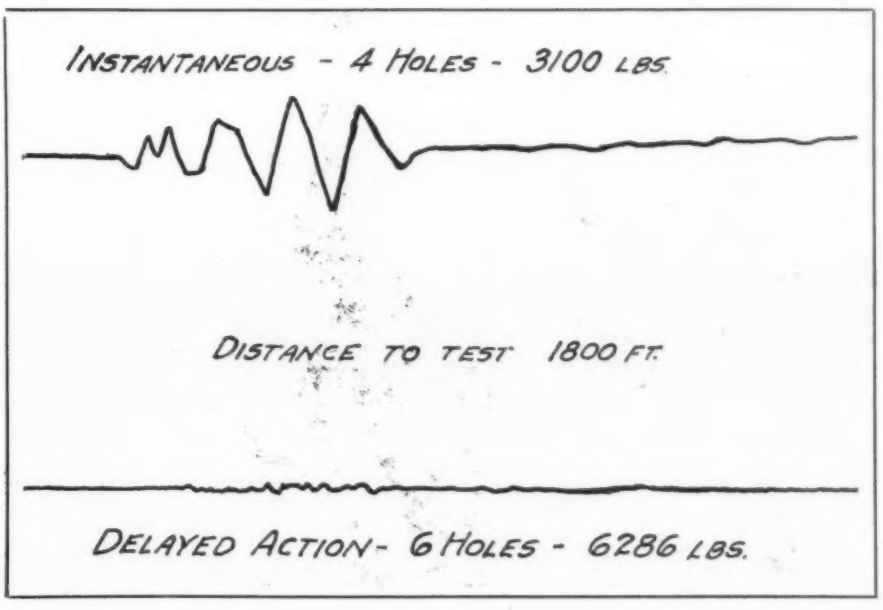
Formerly the company had considerable trouble with the top of banks coming down after a blast, and it was sometimes necessary to go in with wagon drills to clean up. On one occasion a cave-in of this sort took with it a well drill which was sitting 20 feet from the rim. According to Mr. Miller there is every indication that trouble of this kind will be eliminated by delayed-action shooting.

The portable blasting switch developed and built by Mr. Miller is a simple, motor-driven mechanism for closing as many as 20 circuits in any sequence desired. The motor has sufficient power (1/15 hp.) so that the speed remains constant through any normal voltage fluctuation—even down as low as 75 volts. The switch is designed for a fixed interval of one-fiftieth of a second between contacts with the drum rotating at 86 r.p.m.* For safety reasons power is brought to the delayed-action switch through a 3-position drum switch with settings for "off," "run" and "fire." The rotating arm on the delayed-action switch is set in motion about 10 seconds before the blast, and the contact points are energized by moving the drum switch to the "fire" position. The blasting switch is so designed that the firing sequence can start only with the No. 1 hole.

The entire switch is built into a neat, compact carrying case with a removable front cover so that the terminals, the contact points and the rotating arm may be exposed when the unit is in operation. To protect it from possible damage due to blasting vibration, the switch is suspended from two small springs between metal "A" frames (see







*Other time intervals are being experimented with, and there are indications that a slight increase will produce even better results. Mr. Miller believes that a delay of between .025 and .030 of one second will be the ultimate time delay selected for maximum breakage with minimum vibration.

* These comparative vibrograph readings on instantaneous and delayed-action blasts show the remarkable reduction in the vertical component of vibration when delayed action is used. Note, too, that in each case the delayed-action shot employed more holes and more dynamite than the instantaneous.

cut). Normally the unit is set up 150 or 200 feet from the quarry face.

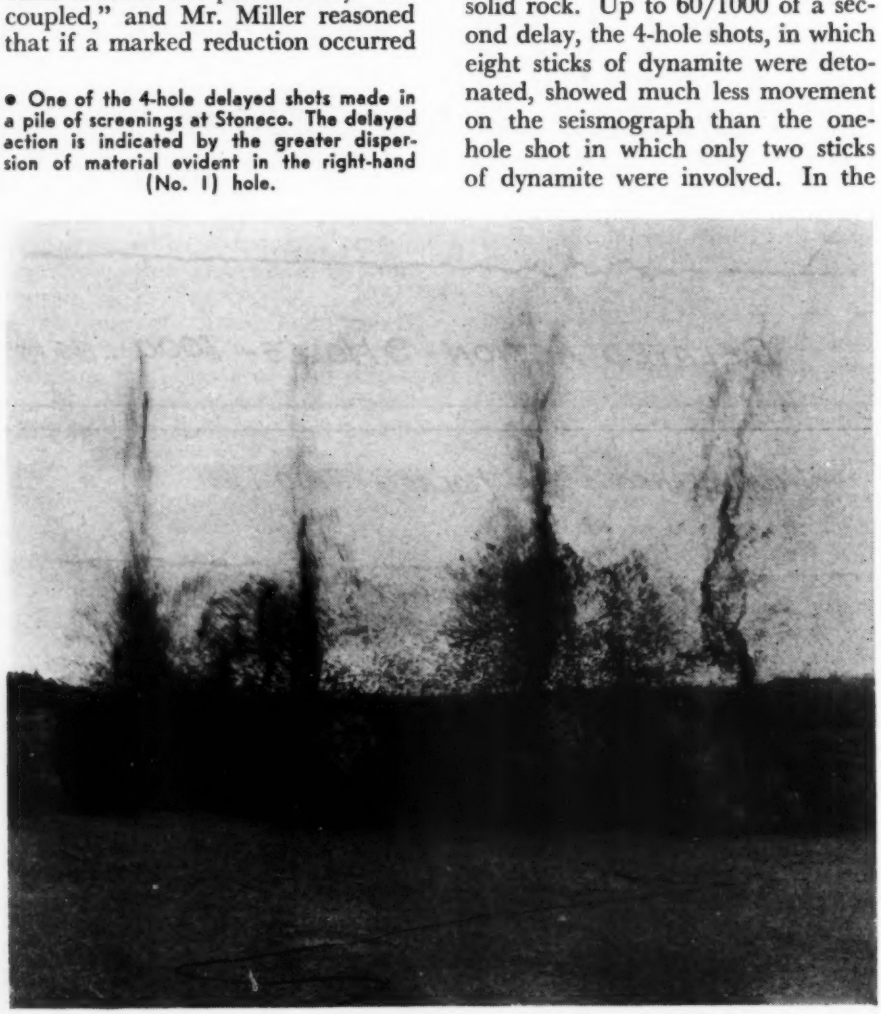
There was clear evidence in the discussions at Chicago of a division of opinion between Mr. Miller and Dr. Leet as to precisely why delayed-action blasting produces less vibration or earth movement than instantaneous blasts employing the same amount of explosive. Dr. Leet advanced the theory that delayed-action shots produce less vibration because a large portion of the total energy released in blasts of this type goes into stone which is already uncoupled from the bank instead of acting against the solid face of stone. Mr. Miller's theory was that the reduction in vibration results from a cancelling action due to the split second delays between adjacent holes; *i.e.* that the No. 1 hole in a delayed-action shot sets up a given vibration which is immediately knocked down by the vibration wave from No. 2 hole, and so on for as many holes as are detonated in the blast.

On the day we visited Stoneco Mr. Miller made a series of 4-hole test shots in a pile of screenings. Here, for all practical purposes, the entire bank of stone was permanently "uncoupled," and Mr. Miller reasoned that if a marked reduction occurred in delayed-action shots it could only indicate that cancellation was taking place. Delays of 20, 40, 60, 80 and 100 thousandths of a second were used in an effort to determine if there was some optimum interval beyond which the successive vibrations would accumulate rather than cancel.

Readings were taken on a Leet 3-component seismograph and on a Cambridge vertical - component Vibrograph. According to Mr. Miller the two instruments check within close limits; although at times the vertical-component graph is sufficient to tell the entire story, he feels that the 3-component graph is highly desirable for complete vibration studies. Comparisons were made between a one-hole shot using two sticks of dynamite, and a series of 4-hole delayed shots (using two sticks and one cap in each hole) with the various time intervals mentioned above, the longer intervals being obtained by using alternate terminals on the blasting switch.

The various vibration readings obtained in this series of test shots seemed to indicate that the effect of delayed action was very much the same in "uncoupled" stone as in solid rock. Up to 60/1000 of a second delay, the 4-hole shots, in which eight sticks of dynamite were detonated, showed much less movement on the seismograph than the one-hole shot in which only two sticks of dynamite were involved. In the longer delays, however, there seemed actually to be a reversal of the effect, suggesting that the cancelling action of successive waves was only partially effective.

• One of the 4-hole delayed shots made in a pile of screenings at Stoneco. The delayed action is indicated by the greater dispersion of material evident in the right-hand (No. 1) hole.



• A regular delayed-action shot at one of New York Trap Rock's quarries, showing the "peeling" action that seems to be typical of such blasts.

Obviously, of course, many more tests under varying conditions will have to be made before any conclusions can be reached. Some of the answers will be forthcoming as a result of day-to-day experience in quarries in many sections of the country, for the delayed-action blasting switch is already being marketed. Its performance at quarries of the New York Trap Rock Corp. and other locations throughout the country seems clearly to establish it as a valuable and practical tool in blasting operations.

Lou Miller had a happy gleam in his eye when he reminded us that there are still a lot of answers to be sought and found. "For example," he pointed out, "we know that we can shoot many more holes with delayed action than we dared to with instantaneous blasts. We don't know yet how many more—that's something we'd like to find out. Proper spacing and burden are other factors still to be determined. We've used burdens up to 23 feet and spacing up to 26 feet with good results; we intend to find out how far we can go."

In a recent letter Mr. Miller disclosed to us that his delayed-action blasting switch is now being manufactured and marketed by Laboratory Associates, Inc., and that several improvements have been made on the original design. His letter went on to say:

"It might be of interest to let you know that we have not as yet

(*Continued on page* 94)

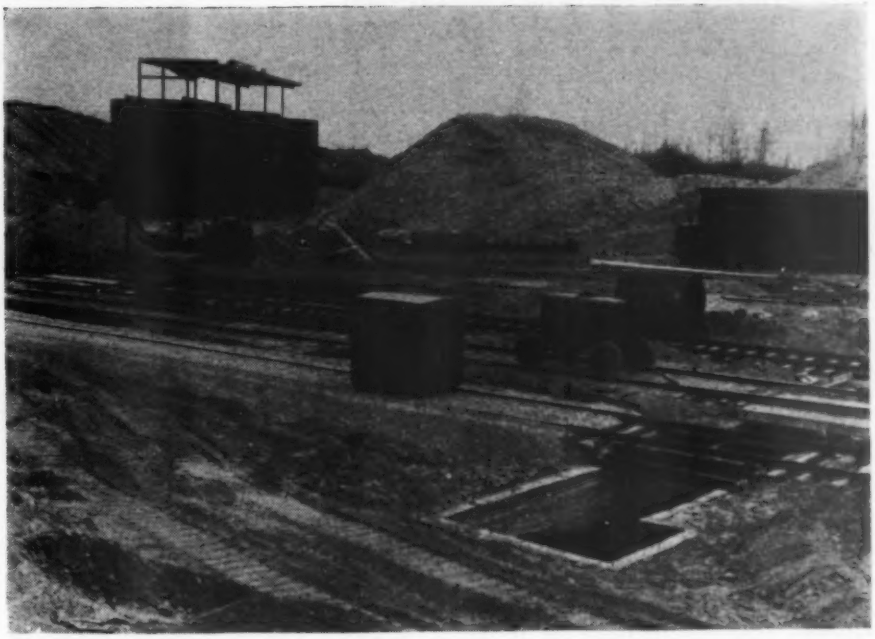
Aggregate Separation Problem Solved by Three Large Silos

another P-Q exclusive

PROCESSING and handling 2,500 cubic yards of gravel a day at our plant in Presque Isle County, Mich., will be simplified by the construction of three large silos situated over a belt-conveyor tunnel.

This operation of our company is located in what is known as the

By J. C. BRADY
E. P. Brady & Co.
Flint, Michigan



• A scene at the plant of E. P. Brady & Company near Millersberg, Mich., while under construction. Note the three silos in the background, provided for gravel storage.

"big cut" along the Detroit and Mackinac Railway, near Millersberg, midway between Alpena and Cheboygan. At one time the railroad operated a gravel plant at this location for its own and commercial uses. When fire destroyed the plant equipment, it was abandoned until late 1946, when we went in and leased the land on a basis of 10 years or longer.

Forty acres lie on the south side of the track and 80 acres on the north. The gravel at this location is considered of a good commercial grade. Although there are rock aggregates in this part of Michigan, there are no other gravel pits which are producing.

Gravel will first be taken from the south side of the track and stored in or adjacent to the three huge silos on the north side before being shipped out.

After the light overburden is stripped off, a 1½-cu.-yd. Northwest crane will load the raw gravel into a traveling grizzly from which it goes directly into a primary crusher with a 24- to 36-in. opening. This crusher operates on a railroad track parallel to the direction in which the crane is traveling.

From the crusher the gravel will dump onto a 300-ft. field belt conveyor 30 in. wide which transfers it to another 60-ft. belt conveyor in a concrete service tunnel under the two railroad tracks. At the south side of the tracks, a 90-ft. belt conveyor takes the material to the roll crusher house where it passes over a 4- by 12-ft. scalping screen.

The crushed gravel is then passed up an inclined belt conveyor 150 feet long to the screen house on top of the three silos, 42 feet above the ground. There a series of three 4- by 12-ft. washing screens will separate the gravel into seven different size groups and then pass by gravity into or around the silos. The different gradations are stockpiled, beginning with the sand and ending with the 1½- to 2-in. maximum size.

• Left: J. C. Brady, under whose direct supervision the plant is being built.
• The outlet of the 195-ft. tunnel through which a 30-in. conveyor belt carries gravel.

All of the belt conveyor equipment, crushers and screens were supplied by the Pioneer Equipment Co. Water for washing the gravel is pumped through 8-in. Armco spiral-welded pipe from a nearby lake on the north side of the track. Electric power for all the operations comes from two 350-hp. General Motors direct-drive 200-kw. diesel generators.

Processed gravel from inside and around the three silos is dropped through a small roller gate in the top of a 96-in. Armco tunnel, 195 feet long, directly under the center of the three silos. Inside this tunnel is a 30-in. belt which conveys the various sizes of gravel to another, ascending belt 125 feet long and into two 60-cu.-yd. loading bins directly over the railroad switch track. Here it is loaded into gondola cars for shipment.

The three silos for storing the

• A closeup view of the three silos and the tunnel. The silos are topped by a screen house 42 feet above the ground.

• Right: A near view of the tunnel outlet. In the background is the framework of the conveyors leading to the bins over the track.

gravel prior to shipping are unusual in their size and construction. They are each 30 feet in inside diameter and are 30 feet high above the circular concrete footings on which they rest. They are 42 feet from center to center with a 12-ft. web between.

Individual Armco liner plates for the three silos are 18 inches wide, with flanged edges for bolting, and approximately 50¼ inches long, with offset joint for bolting. Air wrenches were used to speed up the bolting operations.

Plates for the silos are of No. 5 gage uncoated steel and those for the tunnel are of No. 7 gage. These will probably all be sprayed with asphalt before they are put into service. The web plates, uncurved, are bolted together in the same way, and in turn are bolted through the sides of the silos.

No scaffolding of any consequence was needed in constructing the bins or webs. Metal rungs or steps bolted to the inside of the bins, plus the flanges, make it possible to climb up and down inside. Construction operations were carried on through the winter months, although deep snows in late April interfered with the work.

At present there is only a "pioneer" road into the gravel pit from Hawks and Millersberg. This is impassable at times. However, the county road department expects to relocate and build an improved road between these towns which will give vehicular access to the plant.

Construction of the plant is under the direct supervision of J. C. Brady and James Scott, engineer, and under the general supervision of E. P. Brady.

Delayed Action Blasts

(*From page* 92)

reached any understanding as to the real reason for the reduced vibration. Dr. Leet has been in Texas all summer and we have not had a chance to discuss this further, but during his absence I have been collecting a lot of data along with the screenings tests, and I believe that I now have about enough evidence to prove my theory. That is, that the reduced vibrations are caused by a cancellation action taking place as each successive hole fires. For example, when Number one hole fires, a ground wave is started out, but before it reaches anything like its crest the next hole fires and the wave produced by this second hole 'bucks' the first wave, and so on for each hole following. When we come to the end hole and there is nothing to follow to cancel out this last hole, it seems there might be a possibility that sufficient bucking is taking place to minimize the vibrations created by this last hole. I have proved, though, that a straight maximum amplitude can be obtained by reducing the amount of explosives in the last hole, and that amplitude can be increased by increasing the amount of explosives or burden.

"This surely is one of the most interesting subjects I have ever worked on, and each shot brings out something new. Right now I am making the same tests you saw when we were testing in screenings, but this time we are drilling 1¼-inch holes in the quarry floor where we have solid rock, and we are using one-half stick of dynamite. We are obtaining some wonderful records and they are checking fairly close to those we obtained in the screenings. It is true that we are getting a difference in frequency, but that is what I am particularly interested in determining."

Mr. Miller is quick to disclaim any credit whatsoever for the basic technique of delayed-action blasting, and only under considerable urging (and then with some hesitation) will he admit that the particular method his company has worked out seems to be unique. We think this is understating the case with a vengeance, for on any basis of appraisal the delayed-action switch will measurably widen the application, control and all-around dependability of delay blasting. On this score we believe the quarry industry will some day owe Lou Miller a vote of thanks. In case the matter is overlooked, as such matters are all-too-likely to be, perhaps he will regard our comments here as a very small down payment.

R. W. Rice, president of the Mikolite Mining and Development Company, reported that construction would get underway this year on a $75,000 Mikolite plant near Encampment, Wyo. In addition to the plant, the company plans to erect enough homes to house the families of 60 employees. The firm has been active in the Encampment area for the past 15 years and now operates two properties in this vicinity.

THE LIME PLANT OPERATOR

By WOLF G. BAUER
Consulting Engineer

NATURE, CONTROL, AND INFLUENCE OF FLAMES IN LIME BURNING*

Part II. Nature of Flames

FLAMES play such a prominent and vital part in lime calcination and temperature regulation of kilns, that it behooves us to spend a little thought and analysis on this phenomenon before attempting to design or alter lime kiln burning systems. Upon watching a simple steam or air-atomizing oil burner in action,

Be there one with eye so blind,
Who never pictured in his mind
Drastic improvements—well defined?

And so we have with some fuels like gas and oil probably as many types of "special" burners and burning systems as operators. This is a healthy condition, however, even if some of these installations are not always in accord with basic principles. It is for this reason that some of these fundamental concepts and facts are presented in the simplest manner possible.

Primitive and modern man has always stood in secret awe before the dancing flames of a fire, be they the blue tongues of carbon monoxide above the hot charcoal embers of a cooking fire, or the bright luminescence of hydrocarbon distillates above the wood or coal bonfire. Chemically, the combustion process is classified as rapid exothermic oxidation of carbon and hydrogen, and flame is the more or less visual manifestation of the zone of incomplete or partial combustion.

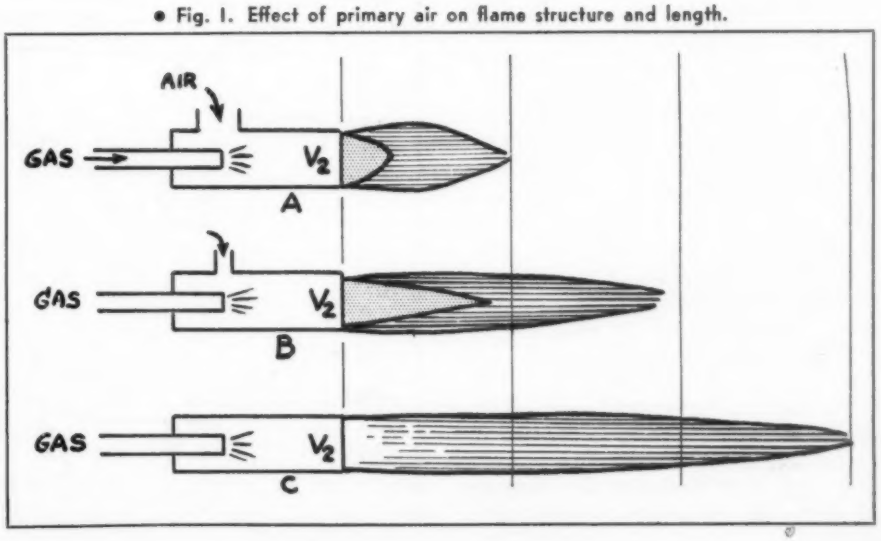
All combustion takes place between molecules and atoms in the free gaseous state except native or free carbon, which burns or oxidizes by diffusion of oxygen gas molecules through the solid structure of the heated reactive carbon cells. Most combustion reactions are chain reactions, by which is meant that several intermediate loosely-held combinations of carbon, hydrogen, and oxygen in various proportions are formed prior to the two end products of all combustion, namely carbon dioxide and water. The speed and manner of these chain reactions are influenced by the fuel type, the temperature and pressure, the physical mixing, and the presence of catalytic or process-promoting agents.

Wolf G. Bauer

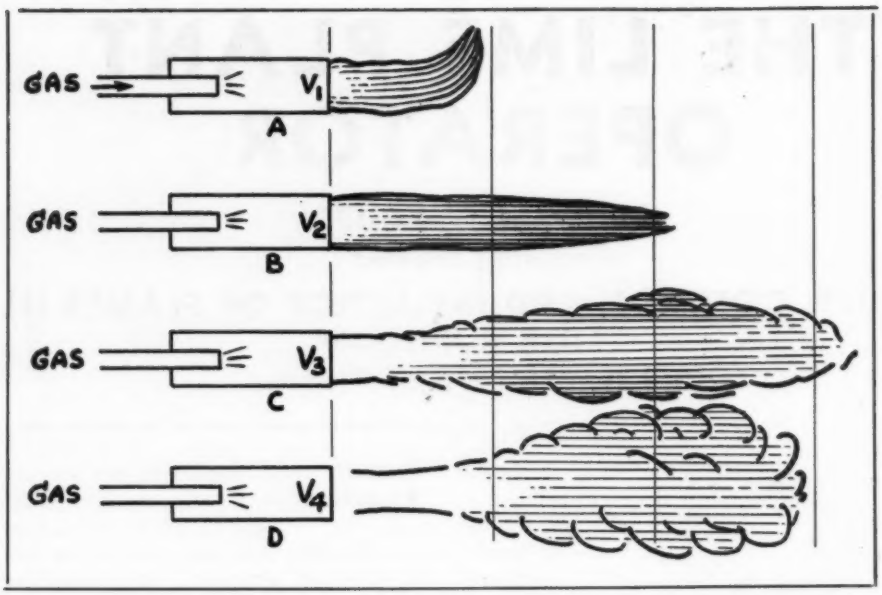
When oxygen or air is brought in contact with carbon, hydrogen, or hydrocarbons at ordinary temperatures, oxidation is very slow. However, when the surrounding temperature is elevated to the minimum critical point called the ignition point, the heat of oxidation released becomes greater than that absorbed, and combustion results. Each fuel has its own ignition point. For example, a stream of producer, city, or natural gas will maintain its burning flame in cold air quite readily. On the other hand, well atomized oil will barely remain ignited in cold air, and an emulsion of pulverized coal will not.

Flame Structure A flame, as we see it, is actually the boundary surface between the combustible gas and the air in the process of ignition and oxidation. This visual surface is not stationary, as may be imagined, but is actually traveling at great speed toward the gas as yet unburned, which is toward the center of the cone-shaped gas stream issuing from the burner nozzle. This speed or so-called flame propagation varies with different gases (oil is always in gaseous form during combustion), being highest for hydrogen, and only one-fifth that of hydrogen for methane and carbon monoxide. The speed is greatly modified by the temperature of the gas or air (or both), the ratio of the gas-air mixture and the degree of turbulency. In the usual fuel mixtures the flame speed is approximately the average of the maximum speeds of the constituent gases in their molecular weight ratios. For powdered coal-air emulsions, this speed may reach 2700 f.p.m. with 50 percent primary air, and flames from other fuels may reach velocities up to 6000 f.p.m. under certain favorable conditions of high temperatures and turbulency. No values can be given, but it is comparatively

• Fig. 1. Effect of primary air on flame structure and length.



*The title of the September article should have been Part I of the current series on flames in lime burning.



• Fig. 2. Effect of gas velocity on flame length.

simple to measure the speed under actual burning conditions by observing the ignition point at various fuel stream speeds.

The bright luminous portion of a flame is due to very small incandescent particles of carbon (1-micron-size) formed by the decomposition of the hydrocarbons in all fuels except coke, or when lowered temperature causes such cracking or sooting in portions of the flame reaction zone.

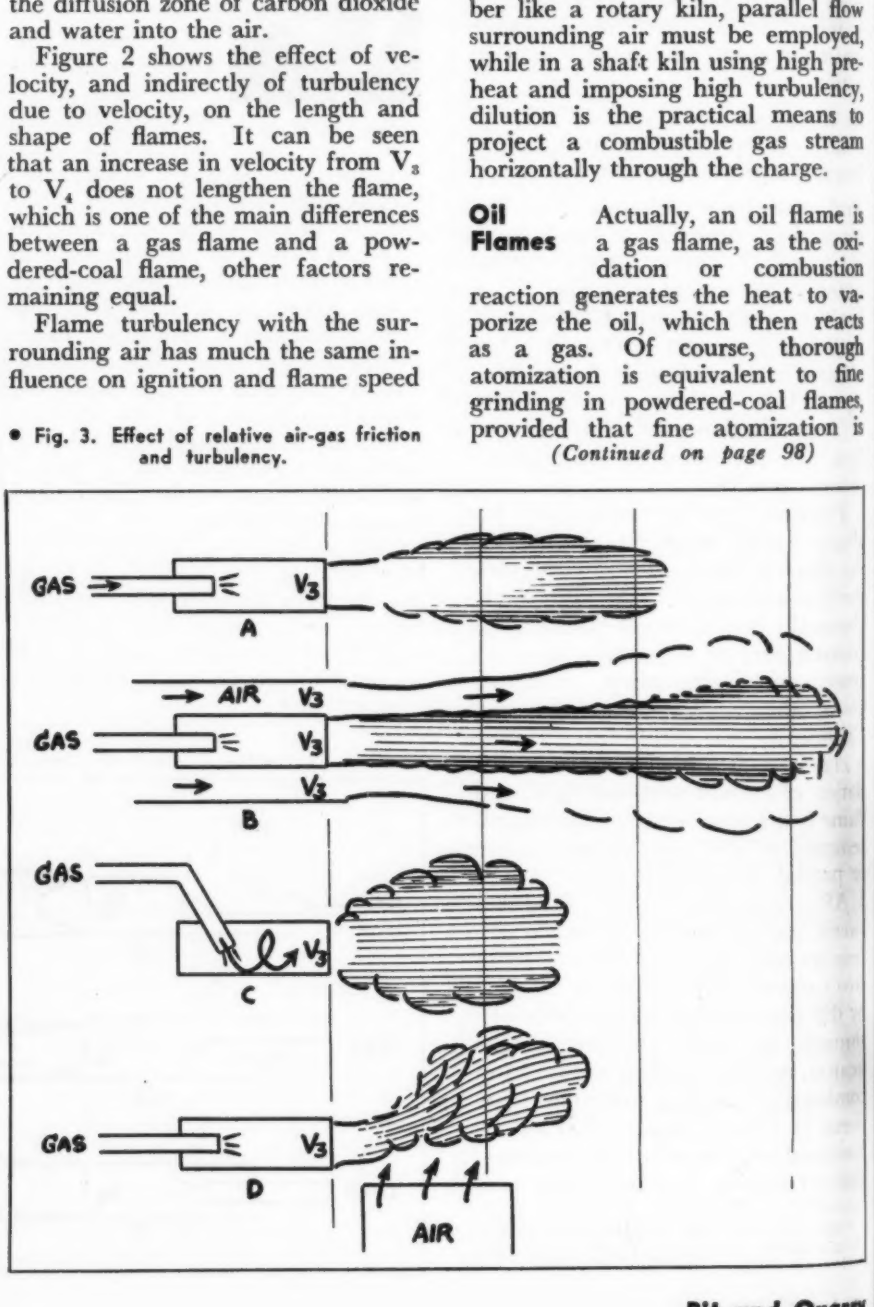
Gas Flames Although flames from different fuels differ physically, fundamentally their structure and burning processes are very similar, and we may study the gas flame as typical and most easily analyzed. Figure 1 shows how the flame lengthens with a decrease in primary or gas-aerating air, which in turn demonstrates the higher speed of flame propagation when combustion air is mixed with the fuel. Velocity is held constant in the illustration of conditions A, B, and C. The cone-shaped inner and outer outlines are due to the higher speed of fuel stream in the center of a pipe or nozzle where wall-friction slows down the outer section. The distinct cone outlines are the boundaries of partial combustion of various gases having different flame speeds. Only one cone and one outer cone is shown, but all commercial fuels have a number of successive cones in which various gas reactions take place. Thus the inner cone shown in Figure 1-A represents air and unburned gas, while the next cone may be a formation of carbon monoxide and hydrogen, and farther on and out the burning of methane and other combustibles, until the outermost rim represents the diffusion zone of carbon dioxide and water into the air.

Figure 2 shows the effect of velocity, and indirectly of turbulency due to velocity, on the length and shape of flames. It can be seen that an increase in velocity from V_3 to V_4 does not lengthen the flame, which is one of the main differences between a gas flame and a powdered-coal flame, other factors remaining equal.

Flame turbulency with the surrounding air has much the same influence on ignition and flame speed as pre-mixing of gas and air. Both increase flame temperature and shorten the flame. Figure 3-B shows the increased length of the flame issuing from a constant speed gas stream when this air friction and surface turbulency is reduced by giving the surrounding air the same speed and direction as that of the combustible gas. Combustion goes on much more slowly by diffusion, the temperature is lowered, and more incandescent carbon particles are produced to give this type of flame higher luminosity.

Flame is also shortened by the manner in which the combustible gas strikes the surrounding air (Figure 3-C) or by which the air strikes or contacts the gas (Figure 3-D). The latter illustration would apply somewhat in the case of shaft kilns. To project a gas flame a long distance in an open combustion chamber like a rotary kiln, parallel flow surrounding air must be employed, while in a shaft kiln using high preheat and imposing high turbulency, dilution is the practical means to project a combustible gas stream horizontally through the charge.

• Fig. 3. Effect of relative air-gas friction and turbulency.



Oil Flames Actually, an oil flame is a gas flame, as the oxidation or combustion reaction generates the heat to vaporize the oil, which then reacts as a gas. Of course, thorough atomization is equivalent to fine grinding in powdered-coal flames, provided that fine atomization is

(Continued on page 98)

Pennsylvania Stone Producers Discuss State Highway Plans

THE business meeting and annual outing of the Pennsylvania Stone Producers Association and the Agricultural Limestone Division was held on Thursday, August 14, 1947, at the Harrisburg Sportsmen's Club. T. C. McPoyle, vice-president of the association, presided over the business meeting.

E. L. Schmidt, new chief engineer of the Pennsylvania Department of Highways, discussed the present highway construction program, the future plans for higher type construction on the primary highway system and also the increased cost per mile for this type of construction. He explained that a great deal of the program was being carried out in the urban sections of Pennsylvania, more particularly, Pittsburgh and Philadelphia, where the present cost of construction is tremendous.

The estimated income from June, 1947, to May, 1948, is $230,000,000. At the present rate of spending, the Highway Reserve Fund, as well as its income, will be spent. Consequently the Department of Highways will have to increase its source of revenue by January, 1949. This can be done by increasing the gas tax. Mr. Schmidt suggested that probably an increase of one cent per gallon on the gas tax would be sufficient. He asked the Pennsylvania Stone Producers Association to lend its assistance in an effort to have the Pennsylvania General Assembly enact such legislation.

Warren Myers, chief maintenance engineer, Department of Highways, discussed the maintenance and construction program being carried on by departmental forces. He stated that his department expected to spend between $8,000,000 and $10,000,000 per year on earth road construction, and that the program of resurfacing and surface treatment will be as extensive in the future as it has been in the past, and possibly greater.

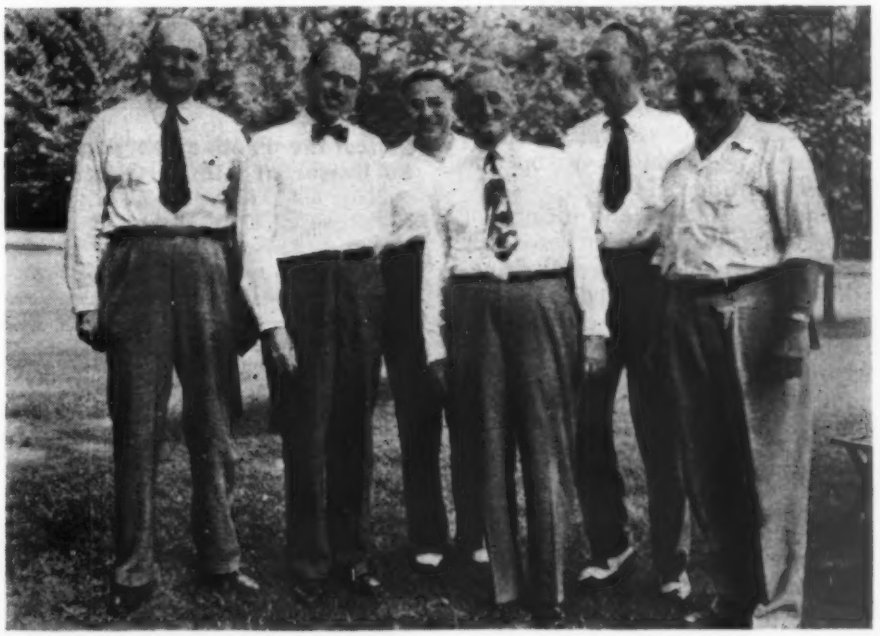
W. A. Warrick, chief construction engineer, Department of Highways, discussed briefly the difficulties which were encountered by his department earlier this year because of rainy weather. He told the producers that new construction was now in full swing and would be rushed until winter weather conditions forced them to shut down. He predicted a larger program for 1948 than that of 1947.

The meeting was adjourned at noon for the outing, which was attended by some 300 producers, contractors, highway employees and friends.

Lime Assn. Reminds Members Of Coming Safety Congress

The National Lime Association has issued a warning that members planning to attend the Safety Congress (Cement and Quarry Section) at the Stevens Hotel in Chicago October 8 and 9 should confirm hotel reservations at once.

Among the events scheduled are the following: an illustrated talk on the practical aspect of accident prevention; a quiz program conducted by the safety engineer of a plant which completed 2,500 days without a lost-time accident; a talk on "Safety for the Supervisor" and an open forum.



• Left to right: W. A. Warrick, chief construction engineer, and Warren K. Myers, chief maintenance engineer, Pennsylvania Department of Highways; H. H. Wagner, general manager, Pennsylvania Stone Producers Assn., Harrisburg, Pa.; E. L. Schmidt, chief engineer, Pennsylvania Department of Highways; O. M. Graves, General Crushed Stone Co., Easton, Pa.; T. C. McPoyle, John T. Dyer Quarry Co., Birdsboro, Pa.

• Left to right: George E. Schaefer, General Crushed Stone Co., Rochester, N. Y.; A. T. Goldbeck, National Crushed Stone Assn., Washington, D. C.; Charles Coburn, The Carbon Limestone Co., Youngstown, O.; E. A. Weymouth, Pittsburgh Limestone Corp., Pittsburgh, Pa.

• Left to right: John Rice Jr., General Crushed Stone Co., Easton, Pa.; C. H. Buckius, assistant chief engineer, Pennsylvania Department of Highways; A. E. O'Brien, executive secretary, Associated Pennsylvania Constructors, Harrisburg, Pa.

Lime Plant Operator

(From page 96)

not overshadowed by excessive turbulency to achieve such droplet dispersion; and oil-air or oil-steam emulsion velocity determines flame length. As in gas firing, oil firing by the diffusion technique will lower flame temperature and slow down flame propagation, thereby lengthening the flame. Combustion space for oil flame heat release may range from 5 to 40 B.t.u./cu. ft./sec., depending on the temperature and pressure of the combustion chamber. It is evident that rotary kiln space is certainly ample for such heat release. In shaft kiln firing with oil, it is quite necessary first to vaporize the oil if the recuperative effect of the lime cooler is to be realized. Thus the gasification of the oil causes such oil-gas to be of greater volume because of the nitrogen and carbon dioxide added, helping thereby to delay combustion.

Coal Flames Very few shaft kilns still fire coal directly in external fireboxes. About the only improvement without complete change to gas firing is to operate these combustion chambers as semi-producers. Rotary kiln firing, of course, has turned from producer gas firing to pulverized-coal firing, which can also be applied to certain vertical calciners where heat exchange is chiefly by convection, and where most of the combustion is completed before the gases pass through the charge.

In a coal-air emulsion, the fuel must first be heated to the ignition temperature by outside radiation. (400 deg. F. - 570 deg. F. for lignites up to maximum of 1100 deg. F. for anthracites. Carbon monoxide and methane, which include producer gas and natural gas, both have ignition temperatures around 1200 deg. F. when mixed with air.) At this point the volatilization and combustion of the hydrocarbons precedes the combustion of the remaining coke. The fine coal particles expand during their distillation period, thus allowing for shorter combustion time due to increased particle surface. The maximum size of the coke particles determines the length of the combustion space in which suspended matter may burn, since coke requires the longest time for complete combustion. Fineness of grind becomes, therefore, a vital factor, while the class of coal (high or low volatile) and kiln combustion chamber temperature play modifying roles.

It has been determined that one-half of the coal is burned in less than one-twentieth of a second, and virtually all is consumed in one-third of a second. By diffusion-type burning technique, this time may be lengthened considerably. (In a rotary kiln burner having, say, a tip velocity of 120 ft./sec., one-half of the combustion and probably most of the distillation is completed about 6 to 8 feet from the point of ignition. Further combustion goes on at a much reduced rate.) Diffusion burning as well as coarser grinding and higher fuel stream velocities can lengthen such flames to over 100 feet. However, flame length must be made a function of kiln length, extent of calcining stone in relation to the required pre-heating zone or distance to external pre-heater, all modified by the necessary heat release for lime temperature control. Next month we shall continue the discussion of flame production from the standpoint of burner arrangement and combustion air.

Mining Glossary Republished By U. S. Bureau of Mines

In response to urgent demands for Albert H. Fay's *Glossary of the Mining and Mineral Industry,* an authoritative dictionary containing some 20,000 technical and local terms, the U. S. Bureau of Mines has republished the original work which has been out of print for many years.

Copies now may be obtained for $1.75 each from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Limestone Production Begun By Kaiser at Alaska Quarry

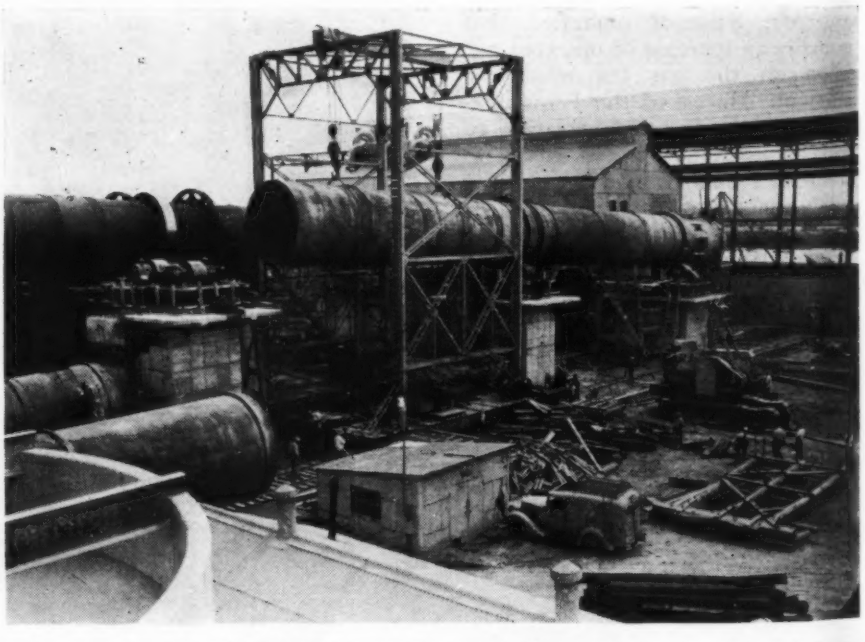
Sixty miles from Ketchikan, on the east coast of Dall Island off Alaska, Henry J. Kaiser's Permanente Cement Company has gone into limestone production at a newly-acquired quarry.

Word of the new venture was received when it became known that Territorial Auditor Frank A. Boyle had granted Permanente permission to transact business within the limits of Alaska. The corporation recently purchased the View Cove quarry from the Superior Portland Cement Company; and according to a report issued by Territorial Mining Commissioner B. D. Stewart, shipments of limestone have already begun.

Novel Device Facilitates Operation at Indiana Plant

At the Brandywine Gravel Company, Greenfield, Ind., a newly installed hydraulic system for producing washed and graded gravel has been the source of much interested observation. A 6-in. pipeline carries sand and gravel from the creek channel to the top of the grader tower.

In order to break up solidified masses of material which the intake pipe did not readily pick up, Joe Boyer, owner, devised a rotary gouger to loosen the gravel.



• Scene at the General Portland Cement Company's plant in Tampa, Fla. (formerly known as the Florida Portland Cement Company), during the installation of a 12-ft. diameter, 426-ft. long oil-fired rotary kiln by the Austin Company, builders and engineers. The kiln and related equipment were secured through the F. L. Smidth Company, and were purchased in Canada as surplus war equipment. The kiln layout includes a reinforced concrete burner building 40 by 64 ft. and 60 ft. high, designed to take lifts up to 25 tons in the servicing and maintenance of equipment; a kiln drive building 44 by 68 ft. and 66 feet high; and a 20-ft. slurry tank (left foreground). A corrugated asbestos roof is being erected over the kiln for weather protection and easy access to all parts of the unit. The facilities, together with a 149-ft. stack, will be completed this fall.

PERSONAL MENTION

John W. Dent

The Georgia Marble Company announces the appointment of JOHN W. DENT as vice-president and general Manager of its Calcium Products Division. Mr. Dent was formerly connected with Thompson-Weinman Company, of Cartersville, as production manager of all their plants located throughout the country, which included a similar position with the Paga Mining company, also of Cartersville.

WILLIAM B. TATE JR., who was formerly connected with the engineering department of the Georgia Marble Company, has taken over the position of sales manager of the Calcium Products Division.

Under Mr. Dent's direction the Calcium Products Division of The Georgia Marble Company will expand its crushing operations and will start immediate construction of additional plants to produce wet ground calcium carbonate pigment of high grade for the paint, rubber and paper trades.

HERBERT H. LAUER, plant manager of the Glens Falls Portland Cement Co., has returned from a visit to cement plants and other industrial plants in the West Indies.

He visited the cement plant at San Juan, Puerto Rico, which he designed in 1936 and 1937, the new cement plant at Ponce, the government cement plant at Trujillo City, Dominican Republic, and the Lone Star plant near Havana, Cuba. Mr. Lauer reported that there is a heavy demand for cement in the West Indies which the plants there are unable to supply.

DEMETRIO ANDRES, who has been in charge of the administration and disposition of the mineral resources of the Philippine Islands since 1924, has been appointed director of mines for the Islands. Mr. Andres prepared the bill which created the Bureau of Mines and reorganized the bureau's setup after the liberation of the Philippines from the Japanese.

The appointment of E. WAYNE HALEY as director of sales for the Southern Alkali Corporation was announced today by W. I. GALLIHER, executive sales manager for the Columbia Chemical Division of Pittsburgh Plate Glass Company and the Southern Alkali Corporation. (Southern Alkali is a subsidiary of the Pittsburgh firm.)

Associated with Southern Alkali since 1935, Mr. Haley has served as assistant director of sales during the past 12 years. As director of sales, he succeeds ELI WINKLER, who will continue with the firm in the capacity of sales consultant.

Mr. Haley will maintain headquarters at 30 Rockefeller Plaza, New York City. Southern Alkali also maintains sales branches at Dallas, Houston, and Corpus Christi.

C. R. MCMILLAN, chief engineer of the South Carolina State Highway Commission, was recently appointed chief commissioner, to succeed U. S. Williamson. At the same time S. N. PEARMAN, district engineer, was made chief engineer, replacing Mr. McMillan.

RICHARD W. SENGER, formerly director of technical employment and training for the American Smelting and Refining Company, has retired from his duties after 41 years with the company. He had been general superintendent at American's smelter at Garfield, Utah, before assuming his most recent office.

S. A. GRETENCORT, JAMES R. GWIN and GORDON A. STEWART have won promotions in the Ideal Cement Company's organization. Mr. Gretencort has been made assistant to the general manager of the company. He was formerly superintendent of the Three Forks Portland Cement Company at Hanover, Mont., an affiliate of Ideal.

Mr. Gwin, who was until recently chief clerk of the Ideal plant at Portland, Colo., succeeds Mr. Gretencort as superintendent at Three Forks. Mr. Stewart, formerly an accountant in the Denver office, has been made chief clerk at Portland.

STANLEY SZCZGIEL, chief engineer of the North Kansas City plant of the United States Gypsum Company, was recently installed president of the Missouri chapter of the National Association of Power Engineers. The ceremony marked the beginning of Mr. Szczgiel's second term as president of the association.

JAMES DICKSON has retired from his position as chief inspector of mines for British Columbia after 21 years of service.

ALTON J. BLANK, general manager of Cementos Atoyac, S. A., and its five subsidiaries, who is Grand Master of the York Grand Lodge of Mexico, F. & A. M., was recently honored in a tribute published in the *York Rite Trestle Board*.

R. K. COMANN has been transferred from the U. S. Gypsum Company's Chicago office to the plant at Genoa, O., where he will serve as quarry superintendent.

EDWARD C. FRICK, formerly with the National Mineral Wool Association, has been named secretary of the New Jersey Lumbermen's Association.

OBITUARIES

FREDERIK E. PAULSON, 82, a retired industrialist of Allentown, Pa., died on August 13 in Grand Rapids, Mich. A native of Sweden, Mr. Paulson emigrated to the United States at 16 years of age. He was at one time president of the Lehigh-Portland Cement Company. After resigning from this position in 1932, he became assistant to the vice-president in charge of traffic on the Reading Railroad staff.

LESLIE L. MOHR, operator of a gravel plant at DeGraff, O., died in a hospital at Bellefontaine, O., on August 4 after a brief illness. Mr. Mohr was 54 years of age.

EDWARD R. CUSHING, who was formerly mine superintendent for the Certainteed Products Corporation of Chicago, died recently in a Chicago hospital as a result of injuries sustained in an accident.

Previously to his recent affiliation with the S. A. Healy Company of Chicago as mining engineer, Mr. Cushing had been consulting engineer for the Celotex Corporation and associate editor of *Rock Products*. He was 41 years of age.

JAMES E. WOODWARD, treasurer of the Anaconda Copper Mining Company and its affiliates, died on July 23 in New York City at the age of 64 years. He had been Anaconda treasurer for the last two years.

JOHN GIBBONS, 70, a former president of the East Peoria Sand and Gravel Company of East Peoria, Ill., died on July 13 at his home in Chilicothe, Ill., after an illness of two years. He became president of the East Peoria Sand and Gravel Company in 1924, and in 1935 established the Chilicothe Gravel Company. He retired from active business three years ago.

WALTER A. KLEIN, who was for 24 years an employee of the Fuller Company of Wauwatosa, Wis., died unexpectedly after collapsing in the Milwaukee City Hall on July 14. He was 49 years of age.

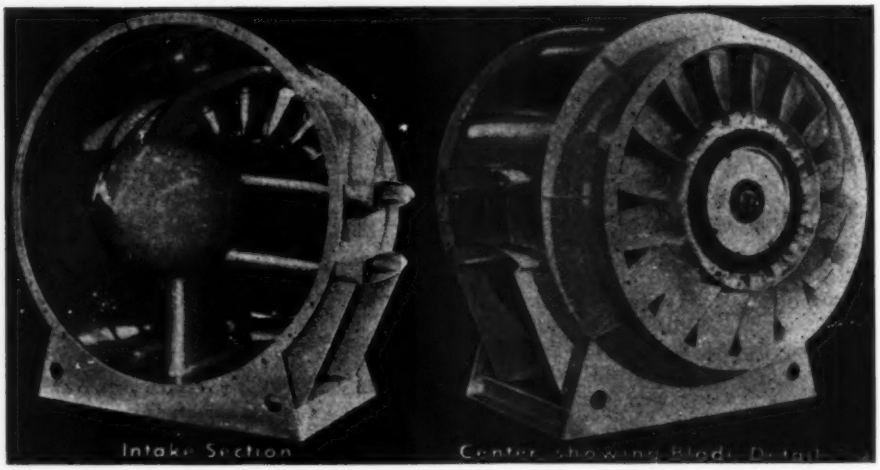
EDWARD H. TAIT, an engineer in the cement and slate industries, died on June 30 at Stewartsville, N. J., after an extended illness. He had recently been associated with the Cameron Pump Division of the Ingersoll-Rand Company.

E. G. SCHLATTER, 39, the former manager of the Denver office of the United States Gypsum Company died on July 23 in Kansas City, Mo.

Thomas Edison Demorest, 43, manager of Criss & Shaver, Inc., sand and gravel contractors, died on June 3 in the hospital at Rock Lake Village, Mo.

WALTER H. EMERSON, 49, who was formerly associated with the Portland Cement Association of New York as sales engineer, died on August 19.

New Machinery And Supplies



Low-cost mine fan.

● Mine Fan

The Joy Manufacturing Company's "Axivane" mine fan, manufactured by the firm at Pittsburgh, Pa., is said to have several unusual features. Its basic design, it is claimed, assures a low operating speed. The wide angle of blade adjustment widens the operating range; and the interlocking action, with blades turning simultaneously, facilitates adjustment.

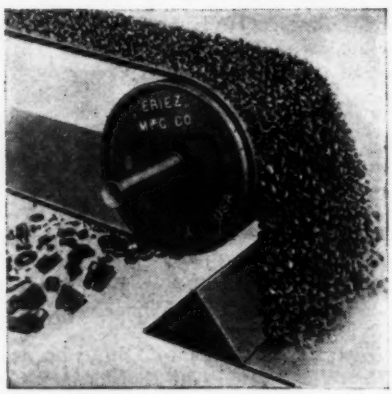
Because the fan is composed of complete factory-assembled units, installation cost is materially reduced. Accessible location of bearings makes maintenance a simple matter.

● Magnetic Pulley

The first completely self-energized magnetic pulley requiring no electric current to generate a magnetic field is now being commercially produced by the Eriez Manufacturing Company, 2267 E. 12th St., Erie, Pa. The pulley is adaptable to all applications requiring automatic separation of magnetic from non-magnetic materials conveyed on a belt.

In the pit and quarry field, Eriez permanently magnetized pulleys are proving increasingly effective head of secondary crushers and pulverizers.

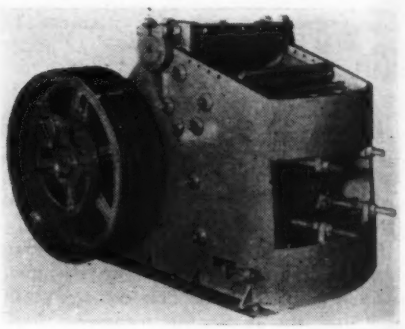
Slag plants are reporting more effective removal of iron-bearing slag with multi-poled Eriez permanently magnetized pulleys, and their effectiveness when installed ahead of cinder crushers has been proven. The unit will work effectively through belts of rubber, canvas, leather or any other non-magnetic material.



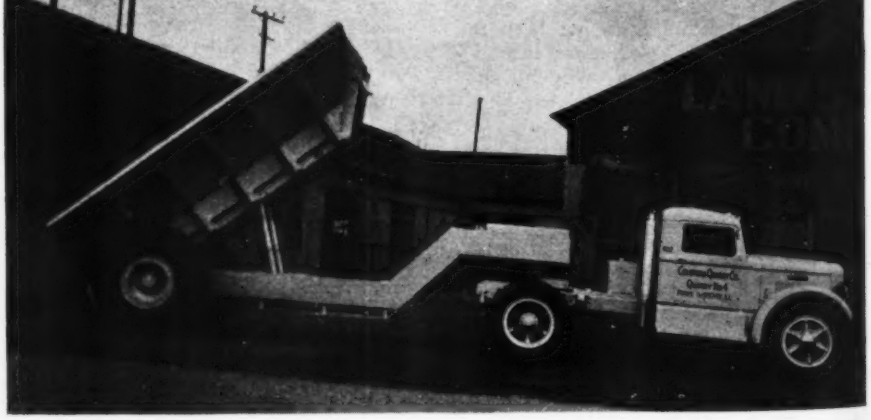
Needs no electric power.

● Lightweight Crusher

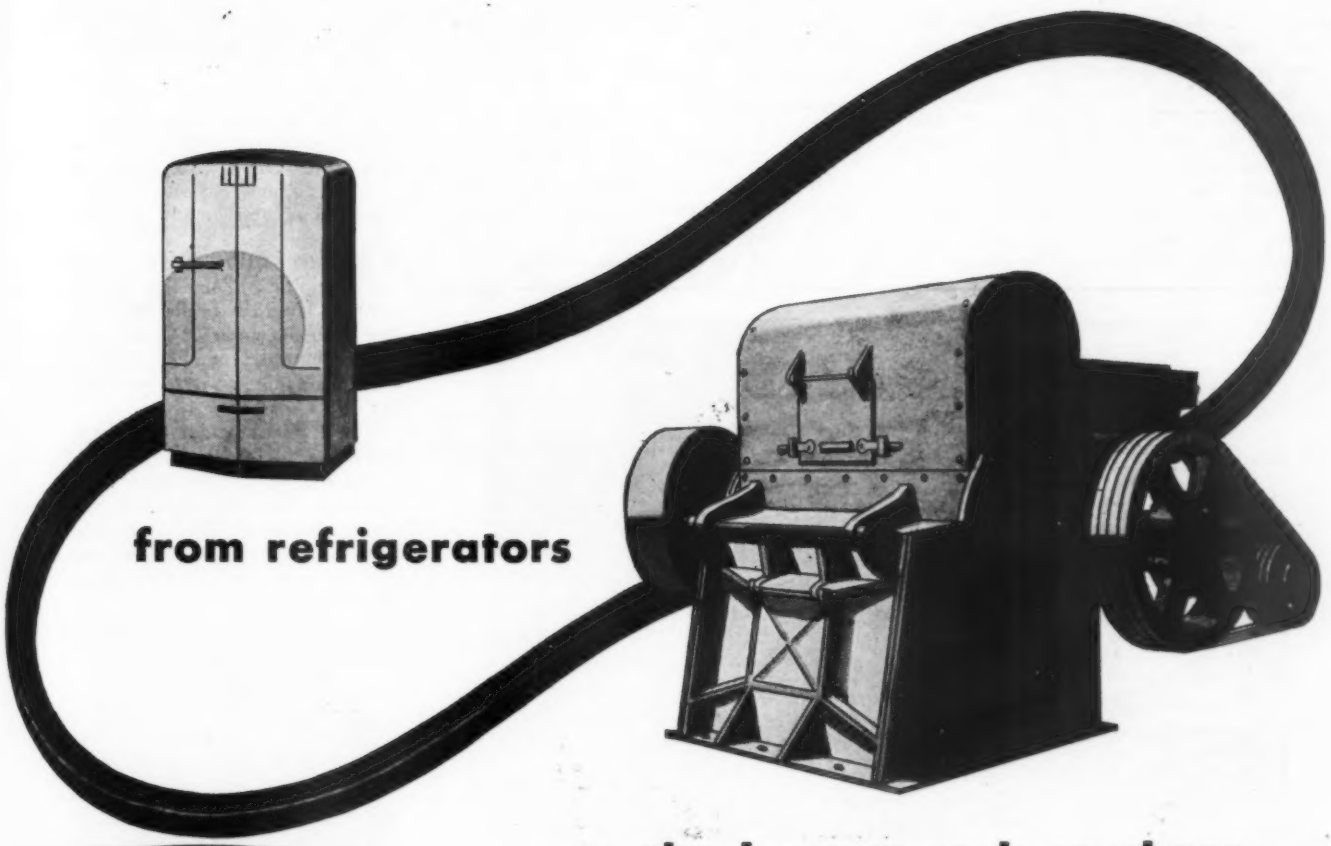
Latest addition to the Kue-Ken Simplex line of crushers, manufactured by the Straub Manufacturing Company, 570 Chestnut Street, Oakland, Calif., is the "Contractors' Special," introduced to fill the demand for a light-



Built for contractors' needs.



Hydraulically operated dump trailers for quarry use are now being manufactured by the Landis Steel Co., Picher, Okla. The trailers are pulled by Autocar C-90-T units, or by Autocar U-90-T units. The trailers are dumped by means of two telescopic hydraulic cylinders, and have a struck capacity of 16 cu. yds. They are of all-electric-welded construction, with an overall length of 22½ ft., width of 10 ft. 1 in., and height of 7 ft. 6 in. The bed is made of 4/16-in. steel plate, which is reinforced with 6-in. ship channel. The trailer is equipped with 24-ply Goodrich Rock Service tires, and has air brakes. The unit weighs 17,190 lbs.



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Power transmission engineers know the many advantages of V-Belt drives . . . compact, noiseless, positive, economical, etc. Experience has proven that additional advantages are derived —at no increase in cost—when Thermoid V-Belts are on the job.

Great strength, long life and uniformity are all built into Thermoid F.H.P. (Fractional Horsepower) and Multiple V-Belts, because every belt—from raw materials to finished product—is manufactured under the most exacting controls.

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weight crusher which will produce ¾- and 1-in. sizes of the hardest rock with low power requirements.

Between 200 and 300 gallons of filtered oil per hour is delivered to the crusher by the oil pump, in addition to the splash system. Large self-aligning SKF roller bearings in the side frames carry the eccentric shaft, eliminating the usual caps, bolts and shims. Since the pitman is always in compression and bears against the lower side of the shaft only, caps and bolts are also here eliminated, and there is a resulting reduction of 90 percent in its weight. A foolproof safety device protects the crusher against overloads.

The Contractors' Special has a jaw opening of 36 inches by 10 or 12 inches. Speed is 350 to 365 r.p.m., and capacity is 40 to 50 t.p.h. at ¾-in. setting.

Engine and pump protected by housing.

● Pump Housing

An interesting development in the design of self-priming centrifugal pumps for drainage work is Jaeger Machine Company's use of overall housings which protect the engine as well as the pump from weather and dirt. Keeping water from sparkplugs, carburetor and crankcase insures quick starting and more efficient operation and adds to engine life. Side panels give instant access to all operating controls. The enclosures on small pumps also lift off when necessary. On larger pumps the big housings give easier access to engine parts.

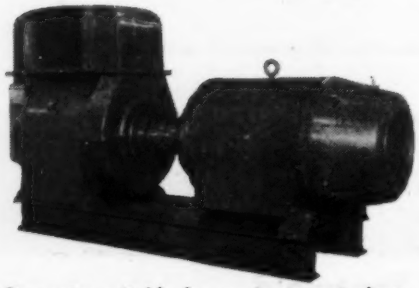
Fast and doubly-sure priming is accomplished by combining "inherent" priming action with "jet" priming—two independent actions which operate simultaneously. Replaceable liners or seal rings, Jaeger patented "Lubri-Seal" which is accessible for inspection, self-cleaning shell design and open-type impellers which are adjustable for wear are a few outstanding features.

● Unit Cooled Generator

A new line of totally-enclosed, unit-cooled generators has been announced by the Motor Divisions of the General Electric Company for use in motor-generator sets or in other generating applications in any non-hazardous atmosphere where the ratings involved make totally-enclosed fan-cooled construction impracticable.

The new generators are available in ratings from 30 to 150 kw. They are especially suitable for use in atmospheres commonly found in steel mills, cement mills and around large machine tools.

Cooling of the generator is accomplished by an air-to-air surface cooler which maintains safe winding temperatures at all times. When used in a motor-generator set with a G-E totally-enclosed unit-cooled d.-c. motor, the entire unit is completely assembled at the factory and shipped ready for installation.

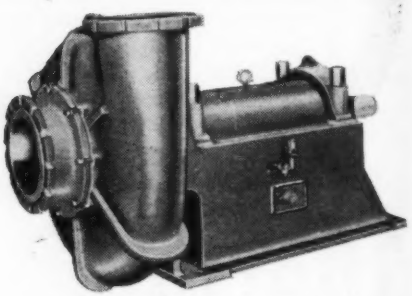


Generator suitable for use in cement plants.

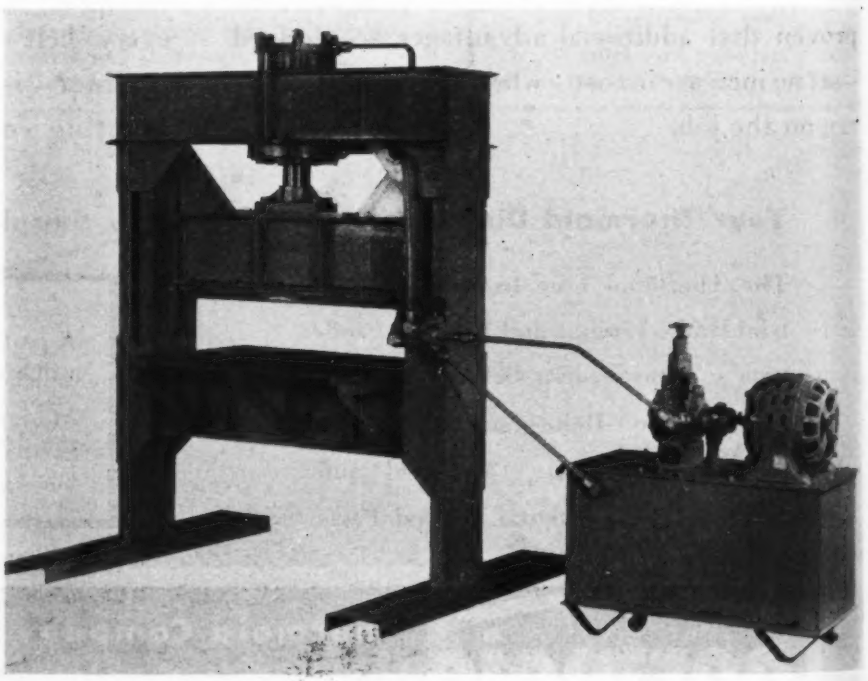
● Brake Lining Sets

To capitalize on the present trend towards bonding brake lining to brake shoes, the Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport, Conn., is introducing a new product, "Ray-BOND PG Sets."

Ray-BOND unchamfered brake lining sets are made to the same specifications as the well known Raybestos PG sets, except that they are undrilled. The product is now available for most passenger cars and the more popular trucks and may be used with any of the accepted bonding processes.

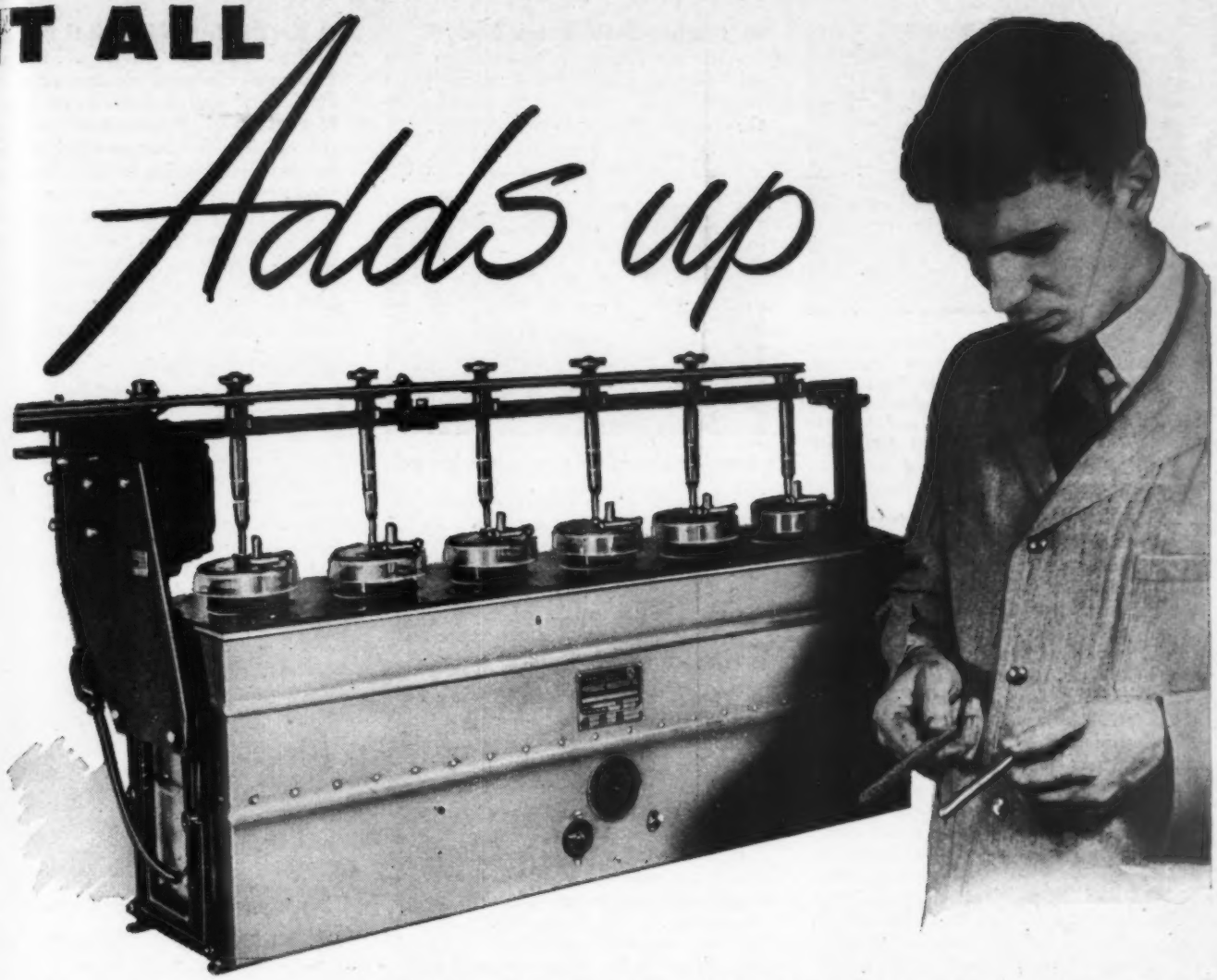


Pettibone Mulliken Corporation, 4710 W. Division Street, Chicago 51, Ill., now features a new slurry pump with wear parts centrifugally cast of abrasion-resistant Diamond alloy. This alloy consists of chromium carbides; its Brinell hardness is 550 to 600, and its tensile strength 60,000 to 80,000 p.s.i.



• A guillotine with a new purpose—cutting stone—is here pictured for the inspection of not-so-bloodthirsty producers. The "Guillotine," marketed by the Western Distributing Company, Tucson, Ariz., reportedly will cut stone up to 12 inches thick. Its capacity is 30 tons per 6 hours (flagstone).

IT ALL *Adds up*



Where special qualities are essential for safe, enduring industrial lubrication, Sinclair Research develops additives that will "further improve the best".

Pictured above is one apparatus used by Sinclair Research to determine the rust-inhibiting efficiency of oils manufactured for turbine use. Chemical additives are studied to provide such protection against rust. Obviously, the treated oil sample used on the metal rod in the technician's left hand has high rust-inhibiting efficiency and prevented the deposit shown on the other rod.

All Sinclair Research and Refinery Control is similarly thorough. *It all adds up* . . . to assure you of lubricant qualities essential to efficient and economical industrial maintenance in all applications.

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Keeps engines clean . . .
Sustains top engine performance

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Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

Recently developed by the Marion Machine Company, Marion, N. C., is the "Marmach Loader," designed for use with the International Industrial Model I-6 wheel tractor. It is an overhead attachment and requires no turning of the tractor. The illustration shows the unit dumping a load.

● Twenty-Ton Tractor

Scheduled for early production at the Springfield, Ill., plant of the Allis- Chalmers Manufacturing Company, is the new 20-ton HD-19 diesel crawler tractor. This giant among A-C machines features three major advantages.

A three-stage hydraulic torque converter has been introduced into the power train for increased capacity and performance. The application of the liquid-drive principle to crawler-type tractors permits horse-power output held constantly near the maximum.

Operating and maintenance points are so located that adjustments and repairs are facilitated. The torque converter eliminates shock and thus lessens wear.

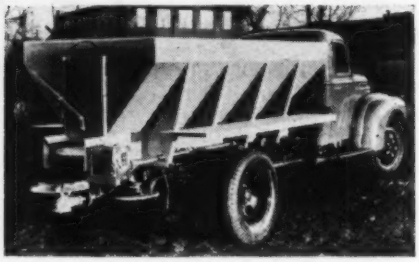
Hydraulically-powered steering levers offer finger-tip steering control; and an adjustable seat offers maximum visibility to front and rear. Other features cited by the manufacturer are adjustable brake pedals, self-energizing brakes, and a large clear operator platform.

The HD-19 transmission has only two forward speeds (0 to 3.0 low gear, 0 to 7.0 high) and one reverse (0 to 5.5). An A-frame track stabilizer design reportedly eliminates twisting strains and provides rigid track alignment. A track tread of 84 in., plus 8 ft. 10⅝ in. of track on the ground provide excellent traction. Ground clearance is 16 in.

● Double-duty Dump Body

A double-duty combination lime spreader and gravel-rock dump body has recently been placed on the market by the Weston Dump Body Company, 321 S. W. 11th Street, Des Moines, Ia.

When used for lime spreading, a 20-



Fan distributes lime evenly over ground.

in.-wide drag chain conveyor carries the lime onto a 21-in. distributor fan. As the truck is driven over the field, the fan spreads the lime evenly over a strip of land 3 ft. or more wide, depending upon the speed of the truck.

Dump gates in the bottom of the body open to a width of 5½ in.

● World's Largest Brake Lining

What is thought to be the largest brake lining ever made is now being manufactured by Raybestos-Manhatten, Inc., Passaic, N. J., for use in Europe on the hoists of rehabilitated mines destroyed during the World War II.

In order to accommodate the huge blocks, an out-rigging extension was designed and constructed by Raybestos-Manhattan for the boring mill table used for the finishing operation. A single piece of the brake lining measures 30 in. wide and 5 in. thick. The weight of a single block is almost 300 pounds. The enormity of this installation is indicated by the hoist brake drums, which are about 22 feet in diameter.

In the area where these blocks will be used mine shafts usually grow deeper as the mines grow older, necessitating the use of larger and more powerful equipment on mine hoists

Huge brake lining will go to Europe.

● Excavators for Tractors

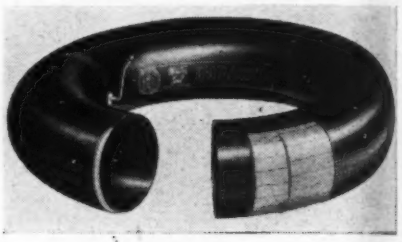
The Trackson Company, Milwaukee, Wis., has expanded its line of tractor-excavators to four: one each for the four sizes of "Caterpillar" track-type tractors. The full line now includes bucket capacities ranging from ½ to 4 cubic yards.

The T6 "Traxcavator" is mounted on, and engineered as a unit with the D6 tractor. Buckets of 1½ or 1¾ cubic yard rated capacity are standard with the new T6. A bulldozer blade is quickly interchangeable with the bucket.

● Puncture Seal

United States Rubber Company announced today the return to production of its "Master Seal" puncture-sealing inner tube, which contains plastic rubber inside the crown to surround puncturing objects.

By sealing the aperture caused by the puncture, the plastic rubber prevents loss of air both before and after the object is removed. Repairs are usually unnecessary because the plastic material flows back into place as soon as the



Plastic rubber seals punctures.

object is taken out. The sealing material is held in place by a honeycomb construction to prevent "bunching up" and shifting.

● Separates Solid Matter

The Cooney Magnetic Screen trap has been developed by Eriez Manufacturing Co., Erie, Pa., to provide a separator for the removal of solid matter in flow lines. The combination of a screen and a permanent magnet built into a single filter-

Strains abrasive materials in pipes.

ing unit, will, it is claimed, remove all abrasive materials in the pipes. The valve-type filter is easily cleaned.

● Monorail Trolley

A new trolley for carrying tail blocks on monorails in power drag scraper systems is being manufactured by Sauerman Bros., Inc., 534 S. Clinton Street, Chicago 7, Ill.

Designed to ride the monorail on four double-flanged steel wheels the trolley

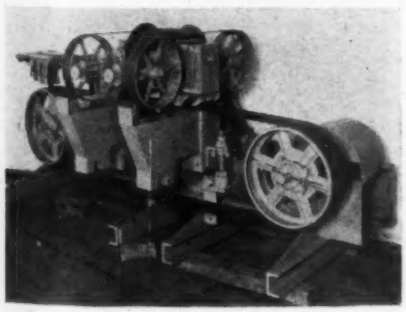
Trolley is adaptable to hand or power shifting.

mounts a Durolite block through which the drag scraper cables pass. The device is adaptable to hand or power shifting and will pass without difficulty over changes in the direction of the monorail.

● Magnetic Separator

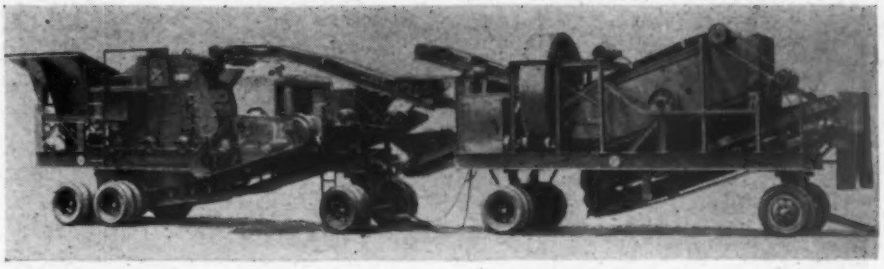
Magnetic Engineering & Manufacturing Company, Clifton, N. J., has completed the fabrication of a cross-belt-type magnetic separator of new design, to be used for the concentration of feebly magnetic ores, the removal of contaminating magnetic specks and iron oxides from chemicals, powders, etc., and for the segregating of magnetic and non-magnetic materials where extremely clean products are required. This is the "Memco-Wetherill" type magnetic separator.

The machine embodies the same general principles of magnetic separation as the old type Wetherill separator, but has been improved mechanically. With the new design, the main conveyor belt can readily be changed without disturbing any other part of the separator. The magnetic gap adjustments are simpler to make with the new design, merely by raising or lowering the lower pole pieces without disturbing the top magnet.



Separator is a cross-belt type.

Standard equipment includes multiple magnetic discharge hoppers, magnetic vibrating feeder, variable speed drive and control panel.



Unit is capable of producing 3 products.

● Portable 2-Unit Crushing Plant

A new portable two-unit crushing and screening plant has been successfully developed by the New Holland Manufacturing Company, Mountville, Pa.

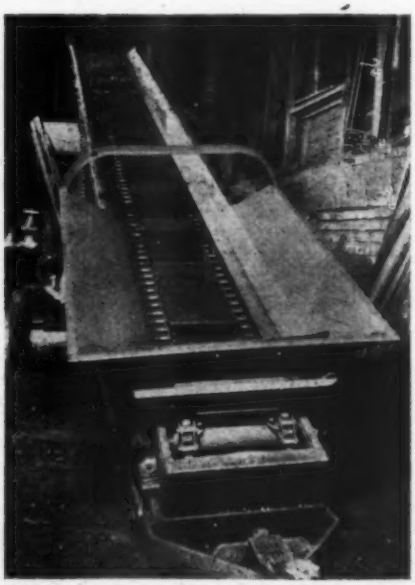
Adaptable to either gravel crushing or quarry operations, the diesel-powered plant operates a double impeller breaker, while an electric generator driven from the same diesel supplies power for driving the feeder, conveyors, screen and elevating wheel on the screening unit. Individual electric motor drives, controlled from the operator's platform on the crushing unit, eliminate chains, sprockets and counter shafts.

This new standard modern New Holland plant is capable of producing one product or two or three. Used in conjunction with the unit are portable conveyors for bin loading or stockpiling.

The crushing or breaking unit is a compact semi or full trailer assembly 28 feet long. It is equipped with rear axle equalizers and with a removable front axle assembly. Warner Electric brakes are controlled from the towing tractor.

● Conveyor for Steep Grades

A new portable conveyor for carrying materials up steep inclines has been added to the extensive line of portable power conveyors manufactured by Material Movement Industries of Chicago. It is known as Model CFL "Tote-All Flight Conveyor" and is available in 14-ft. and 20-ft. lengths. According to the manufacturer this new conveyor will handle bulk material at inclines up to 45 degrees. Two-inch flights bolted to steel roller chain, on 1-foot centers, assure a minimum amount of rollback.



Electric motor furnishes power for conveyor.

Power is furnished by either an electric motor or a gasoline engine which will handle up to 60 tons per hour of 50 lb.-per-cu.-ft. material.

● Fire Extinguisher

A stored-pressure fire extinguisher has been manufactured by the Union Stop-Fire Corp., Brooklyn, N. Y. Heralded as the newest development in fire fighting equipment, this unit requires no pumping.

Extinguisher requires no pumping.

Carbon dioxide has been combined with carbon tetrachloride to produce a chemical extremely effective in putting out fires. A flick of the valve instantly releases a stream of the fluid. The extinguisher has a range of 15 to 25 feet.

● Hard-Facing Metallizing Gun

A new method for hard-facing by using a metallizing gun and "Metco-Weld H," a "wire" composed of a powdered hard-facing alloy extruded with a plastic binder, is announced by Metallizing Engineering Co., Inc., Long Island City, N. Y.

During the spraying operation, the plastic binder is completely volatilized, and the deposit consists entirely of the metallic constituent. Subsequent fusing, with any fusing torch or with an attachment on a Metco metallizing gun, results in a coating alloyed to the base and physically and chemically identical to hard-facings of the same alloy applied by other methods.

The alloy used in Metco-Weld H is said to possess excellent resistance to abrasion.

YOURS FOR THE ASKING . . .

THE *New Bulletin* about the Revolutionary MORRIS TYPE-R SLURRY PUMP

CONTAINS performance charts showing how to select a slurry pump to insure maximum life of the wearing parts when pumping any one of three basic types of slurries each containing a different percentage of solids.

TELLS how the shell is interchangeable for right or left hand rotation . . . how the suction and discharge nozzles can be rotated around axis of pump to positions in any of the four quadrants, a total of 72 possible combinations.

SHOWS how the Type "R" has no internal studs or bolts . . . how the impeller is easily removed without disturbing piping . . . how the gland is under suction pressure only, quickly dismantled by removing four bolts . . .

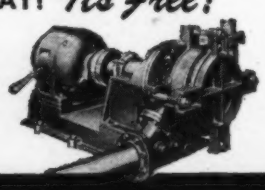
DESCRIBES the ingenious design of the stuffing box and its minimized packing troubles . . .

SHOWS how the Type "R" is maintained *at very low cost* . . .

READ how its advanced design efficiently handles ore concentrates, tailings, slag and residue from filters and classifiers; also all types of caustic or acid mixtures containing abrasive solids. Ideal for cement and glass mills.

Write for the Type "R" BULLETIN TODAY! *It's Free!*

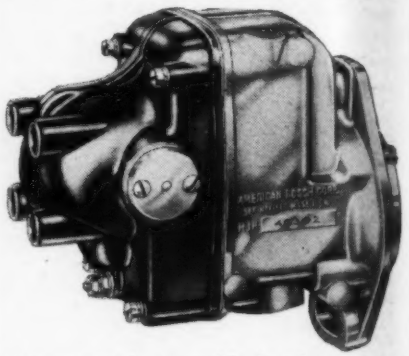
MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities



MORRIS *Centrifugal Pumps*

● New Series of Magnetos

The American Bosch Corporation of Springfield, Mass., has announced a new series (MJH) of magnetos especially



Magneto with removable breaker assembly.

applicable to tractors and industrial engines of small and medium size.

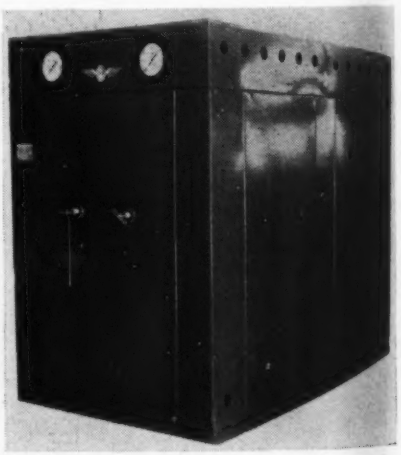
According to the manufacturer it combines rugged mechanical features and fine electrical characteristics, employing an oil-impregnated stationary winding and an Alnico magnet rotor. The 1- and 2-cylinder gearless types are equipped with ball bearings on the drive end of the rotor shaft, while those with gear-driven distributor rotors have ball bearings at both ends of the magnet rotor.

The breaker assembly is removable as a unit, and once the contact points are aligned on the assembly, no further alignment is necessary after installation of the unit in the magneto.

● High Pressure Accumulator

Greer Hydraulics, Inc. of Brooklyn, N. Y., has developed a new "Hi-Lo Pressure Power Pack" to be used for actuating huge presses.

The unit consists of an all-steel cabinet, housing all the circuit components. Removable panels are provided for ease



At high pressure accumulator operates at 2,000-2,500 p.s.i.

of maintenance. The hydraulic circuit is powered by a dual-shaft, 30-hp. electric motor, one end of which drives a low-pressure pump capable of delivering 9 gallons of fluid every 15 seconds; the other end of the motor drive-shaft drives a high-pressure pump with a capacity of 3 gallons every 15 seconds. The low-pressure fluid is stored in three 10-gallon

accumulators and is released instantaneously when the system calls for it. The high-pressure fluid is stored in two 10-gallon accumulators. The low-pressure accumulators operate between 300 and 200 p.s.i., while the high-pressure accumulators operate between 2500 and 2000 p.s.i. Other components of the system include suitable relief and control valves, a 100-gallon reservoir equipped with suitable filters, a low-pressure gauge and a high-pressure gauge to indicate the pressure in the low-pressure line and high-pressure line respectively. Each accumulator is equipped with a charging valve and an air pressure gauge for use in preloading the accumulators and for indicating at a glance the preload pressure at any given time.

• Hydraulic Lift Truck

A heavy-duty lift-truck embodying a radically different design is now in production at Mixermobile Manufacturers', Portland, Ore., plant. The main feature

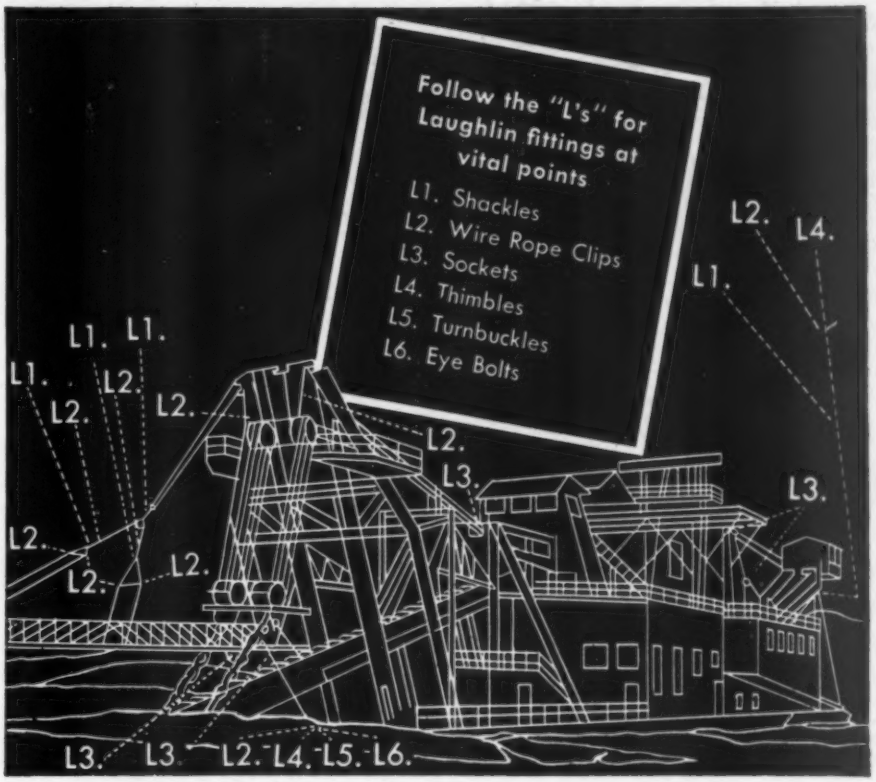
Will handle 6,000 lbs.

of this new type lift truck is the hydraulic lift that will handle 6,000 pounds to a height of 8 feet, or 4,000 pounds to 11 feet, yet collapse completely into the truck body like the bellows of a camera. With the lift in lowered position, there is no track or front obstruction to prevent the Wagnermobile lift from passing under low-head clearance.

The Wagnermobile lift weighs 7425 pounds with fork and boom; it can be used inside freight cars or in other narrow, tight quarters. A variety of quick-change attachments are available, making possible the handling of a wide variety of heavy or bulky materials. Attachments include forks to handle pallets, lumber, etc. "Scoop" type buckets in both ½-yard and ¾-yard capacities for grain, sand, gravel, dirt, sawdust, sheet steel, pipe, castings, and other heavy, odd-shaped loads can be easily handled with the boom attachment.

Complete but condensed information on nonmetallic minerals production is contained in the statistics chapter of the Pit and Quarry Handbook.

GUARD THESE POINTS FOR OVER-ALL ECONOMY



Wherever you use wire rope or chain you'll gain these extra advantages by specifying Laughlin quality fittings:

IN ECONOMY

The expense and delay of ordering "specials" are eliminated. You'll find the fittings you want are usually *standard* in Laughlin — the most complete line. Stronger because they're *drop-forged* and weldless, they'll outlast the wire rope. And 3 Laughlin "Fist-Grip" clips will do the work of 4 ordinary U-bolts.

IN PROTECTION

Lives, loads and equipment are safeguarded by Laughlin Safety Hooks and Safety Clips. Every Laughlin fitting is designed to protect your wire rope and chain — to bear its full share of the load and grip without crushing.

Your costly mining equipment needs the *distributed* protection of always dependable wire rope and chain fittings. Laughlin fittings provide that protection, with added economy and trouble-free service. For a complete catalog write to Dept. **3**, THE THOMAS LAUGHLIN COMPANY, Portland 6, Maine. Laughlin fittings are distributed through mill, mine and oil field supply houses.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Live Wire!

SECO VIBRATING SCREENS

The top illustration may seem a little exaggerated, but there's no exaggeration in the statement that "dead areas" just can't exist on the screening surface of a Seco. No wonder then, operators everywhere (live wires themselves) choose Seco vibrating screens for screening more tons per hour . . . every hour . . . month after month . . . year after year . . . with little or no maintenance. Investigate Seco advantages today. Write for "A Guide to Better Screening." Dept. A.

TRUE CIRCULAR MOTION VIBRATING SCREENS

SECO

SCREEN EQUIPMENT COMPANY, INC.
BUFFALO 21, NEW YORK
In Canada: United Steel Corp., Ltd., Toronto

TRADE NOTES

The promotions of four divisional managers of Nordberg Manufacturing Company, Milwaukee 7, Wis., to vice-presidencies of the company has been announced. The new vice-presidents are Roland W. Bayerlein (Heavy Machinery), H. H. Talboys (Railway Equipment), D. A. Cheyette (Crushers) and R. R. Shafter (Process Machinery).

Mr. Bayerlein has been associated with Nordberg Manufacturing Company

D. A. Cheyette

R. R. Shafter

since 1919. He served as a sales engineer, doing estimating, making power plant analyses, and formulating proposal specifications for steam and diesel engines. In 1933 he became assistant to the vice-president in charge of sales and engineering of the Heavy Machinery Division and two years later was appointed manager of that division.

Mr. Talboys joined Nordberg in 1923 as manager of the Railway Equipment Division and designed and developed the tools made by that division. He served as director of the Track Suppliers Association in 1935 and 1936 and president in 1937. He was also a member of the board of directors of the National Railroad Applicant Association from 1935 to 1937 and president in 1937.

Mr. Cheyette has a background of 30 years of experience in crushing, grinding, cement and mining machinery design and application. He was associated for several years with Kennedy-Van Saun Manufacturing and Engineering Corporation and with the Traylor Engineering and Manufacturing Company. In 1937 Mr. Cheyette joined Nordberg and became sales manager of the Crusher Division and general manager in 1944. He was instrumental in the formation of the Process Machinery Division in 1944 and served as sales manager of that Division since its inception.

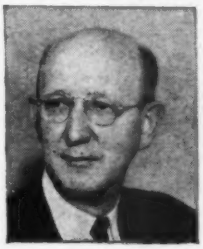
Mr. Shafter formerly was affiliated with the Allis-Chalmers Manufacturing Company and served on the staff of the Traylor Engineering and Manufacturing Company for over 33 years. Mr. Shafter supervised the design and construction of many crushed stone, gravel, cement, clay, lime, alumina, mining, milling and smelting plants, and has been active in designing and selling heavy crushing, grinding, calcining, and smelting ma-

chinery. He joined Norberg in 1944 to be in charge of the Process Machinery Division.

C. W. Loomis, manager of the Bemis Bro. Bag Co. Memphis plant since 1931, has been transferred to St. Louis, where he will assume important administrative duties at the general offices of the company.

F. C. Chenault, sales manager at Memphis, succeeds Mr. Loomis as manager of the Memphis plant. He assumed his new duties on July 1.

R. R. Duff, formerly in the market research department in the company's general offices in St. Louis, succeeds Mr. Chenault as sales manager at the Memphis plant.



R. W. Rausch

Ralph W. Rausch, who has been assistant chief engineer at Link-Belt's Pershing Road plant, in charge of estimate-engineering since 1933, has been appointed chief engineer. He succeeds C. S. Huntington, who has retired because of ill health.

Mr. Rausch entered Link-Belt employ in 1925 at the Caldwell plant, Chicago, as a belt conveyor specialist. He has been a member of the Pershing Road plant since 1927.

Manhattan Rubber Manufacturing Division of Raybestos Manhattan, Inc., recently received second award for outstanding excellence of its business magazine advertising during 1946 and 1947 in the National Advertising Agency Network competition. This is the fourteenth award received by Manhattan in the fields of advertising, merchandising and public relations.

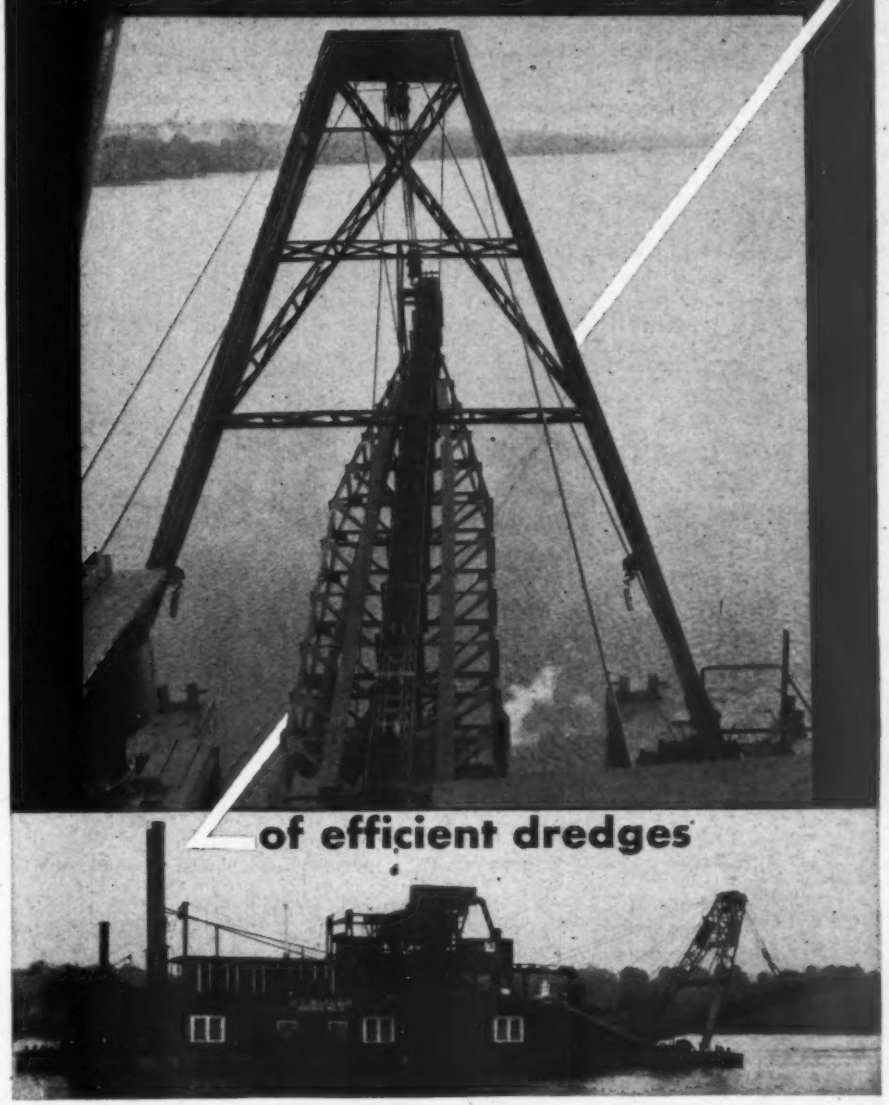
George M. Schurman, president and treasurer of the National Bag Corporation since 1930, has been elected a director of American Brake Shoe Company.

The annual Associated Business Papers' Advertising Competition has awarded the General Electric Company a certificate award in Division 3 Machinery and Equipment, for the excellence of their industrial diesel-electric locomotive campaign. The G-E campaign was selected for the award from a total of 181 industrial advertising entries.

The GMC Truck and Coach Division recently announced the introduction of an improved line of light and medium-duty trucks with an entirely new and bigger cab. Price adjustments on the heavier line of trucks, above 18,000 pounds gross vehicle weight, have also been announced. All price adjustments cover standard base chassis and cabs.

It was stated that in addition to the increases made as the result of improvements and refinements in the new line of trucks, adjustments were necessary due to the rising costs of material and labor.

BUSINESS END



of efficient dredges

THE EAGLE "SWINTEK" DREDGING LADDER

You're looking at the business end of the E. T. Slider Inc. Dredge No. 5 in the photograph above—recent modernization of this dredge included installation of the 15"-75' Eagle "Swintek" Dredging Ladder shown. Note side braces for additional strength to permit underwater traversing of ladder for more thorough clean up of deposit. "Swintek" was the choice because a similar installation on Dredge No. 4 has, for 17 years, given a 30% increase in production . . . has eliminated previous difficulty with boulders and penetration of hard pan. About this new dredging ladder, Mr. Slider says, "Our Swintek cutter and ladder work perfectly."

Continuous operation . . . even flow of materials . . . reduced wear on pump . . . deeper dredging . . . dredging of hard packed material—the Eagle "Swintek" gives you all these important advantages. Continuous traveling chain keeps oversize away from nozzle and out of system—eliminates clogging and damage. Chain cutter bars cut and loosen deposit to increase volume pumped. Send for Catalog 745.

75th Anniversary 1872-1947 Progress...Service

Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS

133 Holcomb Ave. • Des Moines, Iowa

The International Paper Products Division of the International Paper Company has opened a branch sales office in Los Angeles, with Frank N. Gladden as district sales manager. The office is located at 607 South Hill Street, Los Angeles.

W. W. Shipley, vice-president of Laclede-Christy Clay Products Co., St. Louis, Mo., has announced the purchase of all the capital stock of the Osceola Silica & Firebrick Company, of Osceola Mills, Pa., which is in the heart of the well-known Clearfield County fire clay district. It was stated that the purchase of this company was made out of working capital. Annual capacity of the plant is 10,000,000 fire brick. The transaction marks the advent of Laclede-Christy in the large eastern industrial market.

Albert B. Agnew has been appointed general manager of the Osceola Company. He was associated with Harbison-Walker Refractories Co. for over 30 years, during which he was superintendent of plants in Pennsylvania and Chicago.

A series of dealers' service training schools instigated last year by The Four Wheel Drive Auto Company is paying off in better service to its customers' trucks, according to Lloyd Pernot, service division manager for the company. The company's sixth service training school period since the war ended recently.

Sixty-eight men have attended these schools to date, representing Canada, Mexico, Honolulu and Chile, in addition to the United States.

Wendell J. Farischon was recently appointed news editor of "Caterpillar's" news service of the Caterpillar Tractor Co., Peoria, Ill. He succeeds Jerry Reichart, who has accepted a position as editor of Employee Publications at the Cutter Laboratories, Berkeley, Calif.

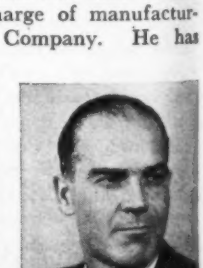
Theodore Aulmann

The Eagle Iron Works of Des Moines, Ia., this year is looking back upon 75 years of service to the mining, clay products and sand-and-gravel industries. Lawrence Aulmann and his brother, George W. Aulmann, founded the company in the early 1870's. A small machine shop and foundry was acquired, and the brothers began almost immediately to specialize in equipment for the clay products industry. Later they were called upon to develop certain equipment for the sand-and-gravel industry.

In the large modern plant the following types of equipment are turned out: Eagle single- and double-screw washer-dehydrator, Eagle single- and double-screw washer-classifier-dehydrator, Eagle log washer for abrasives, and Eagle sand tank. Officials of the firm are the following: Theodore Aulmann, president and treasurer; Ralph L. Aulmann, secretary; C. B. Laird, sales manager; H. L. White, chief engineer; Al Hartman, plant superintendent. Mr. Hartman has completed nearly 50 years of service, having joined the company in 1898.

Harold L. Hoefman has been elected vice-president in charge of manufacturing for Link-Belt Company. He has been affiliated with the company since 1920 and has been general manager of the Pershing Road plant in Chicago since 1943.

H. L. Hoefman



D. E. Davidson

At the same time the company announced the appointment of David E. Davidson as general manager of the Pershing Road plant, to succeed Mr. Hoefman.

COMPARE A
ONE CU. YD. CARRYING CAPACITY
Page Automatic
WITH YOUR PRESENT DRAGLINE BUCKET!
ONE CU. YD. RATED CAPACITY
The Page AUTOMATIC is built large enough to make the carrying capacity *equal* to the rated capacity size. A 1 cu. yd. Page bucket will load and carry 1 cu. yd. of material. Ordinary buckets do not have sufficient allowance for the curved portions and the open end and, therefore, carry only ½ to ¾ as much material as rated capacity indicates. A bucket with a struck measure of less than 31.8 cu. ft. cannot possibly average a 1 cu. yd. pay load.
Check the struck measure of your bucket. See what you are loading! Ask your dealer. Write for new booklet "How to Get the Most Out of a Page AUTOMATIC Dragline Bucket." It lists minimum struck measurements for all size buckets giving *true* ratings.
Page AUTOMATICS are built in perforated, slat or standard designs and are guaranteed to outdig any other dragline bucket at any depth.
PAGE ENGINEERING COMPANY
Clearing Post Office
Chicago 38, Ill.
PAGE
Automatic
DRAGLINE BUCKETS and WALKING DRAGLINES

C. R. Heller

Link-Belt Company has announced the re-establishment of a sales office in Washington, D. C., at 1009 Washington Gas Light Bldg., 11th and H Streets, N.W., in charge of C. R. Heller, Washington representative.

Mr. Heller's duties will be confined to work with foreign purchasing commissions and with the governmental and armed service bureaus. Industrial sales in the District of Columbia will continue to be handled by the company's office in Baltimore.

H. C. Wallace has been appointed manager of Air Reduction's Louisville district according to a recent announcement by H. F. Henriques, general sales manager. Mr. Wallace succeeds the late R. S. Moore. Mr. Wallace started with Air Reduction in 1929 and spent all 18 years in the Louisville district.

Hewitt Rubber Division, Hewitt-Robins Inc., has announced that "Maltese Cross" conveyor and elevator belting again is in production after being withheld from manufacture during World War II because of government restrictions on use of premium quality materials.

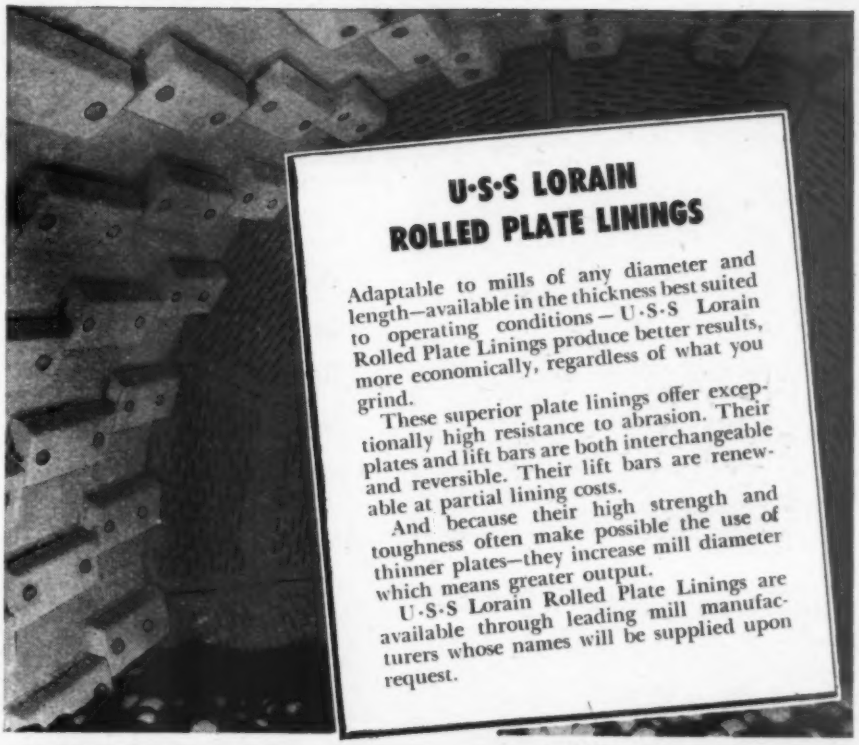
Construction features of the belting include: special Hewitt-developed rubber compounds; selected staple cotton reinforcements; high flexing qualities and resilient rubber frictioning between plies; scientific treatment of the entire belt carcass against mildew; layers of highly elastic skim rubber to withstand shock loads; tough cover anchored to carcass by special Dura-Bond breaker strip.

The Four Wheel Drive Auto Company announces the appointment of the M. B. Salisbury Company, Inc., Topeka, Kan., as FWD distributor for that portion of Kansas east of and including the counties of Republic, Cloud, Clay, Geary, Lyon, Coffey, Allen, Neosho and Labette. FWD sales manager for this territory is H. G. Engel, and C. E. Dalum is the local FWD salesman.

George Toth, formerly district sales engineer for the Socony Vacuum Oil Company in North and South Carolina, has joined the sales staff of the R. H. Sheppard Company, manufacturers of Sheppard diesel engines. Mr. Toth has been assigned to the southern sales territory covered formerly by Ed MacFarland, who will be transferred to the Eastern and New England area.

Hewitt-Robins Inc. has announced the appointment of I. H. Welch as sales representative covering the central Iowa territory, with headquarters in Des Moines. He will handle the entire Hewitt Rubber line of hose, belting and molded rubber goods, as well as the complete Robins Conveyors line of materials-handling equipment.

Two Answers to your Grinding Problems



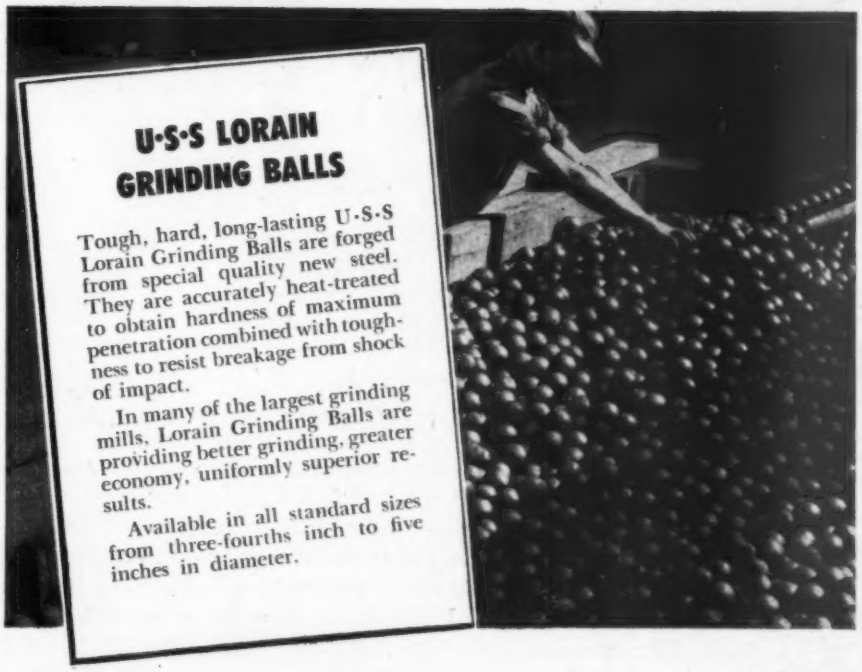
U·S·S LORAIN ROLLED PLATE LININGS

Adaptable to mills of any diameter and length—available in the thickness best suited to operating conditions—U·S·S Lorain Rolled Plate Linings produce better results, more economically, regardless of what you grind.

These superior plate linings offer exceptionally high resistance to abrasion. Their plates and lift bars are both interchangeable and reversible. Their lift bars are renewable at partial lining costs.

And because their high strength and toughness often make possible the use of thinner plates—they increase mill diameter which means greater output.

U·S·S Lorain Rolled Plate Linings are available through leading mill manufacturers whose names will be supplied upon request.



U·S·S LORAIN GRINDING BALLS

Tough, hard, long-lasting U·S·S Lorain Grinding Balls are forged from special quality new steel. They are accurately heat-treated to obtain hardness of maximum penetration combined with toughness to resist breakage from shock of impact.

In many of the largest grinding mills, Lorain Grinding Balls are providing better grinding, greater economy, uniformly superior results.

Available in all standard sizes from three-fourths inch to five inches in diameter.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York
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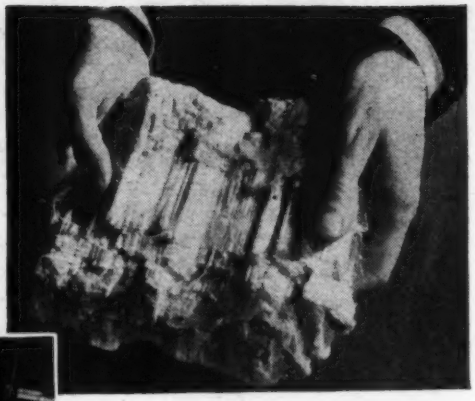

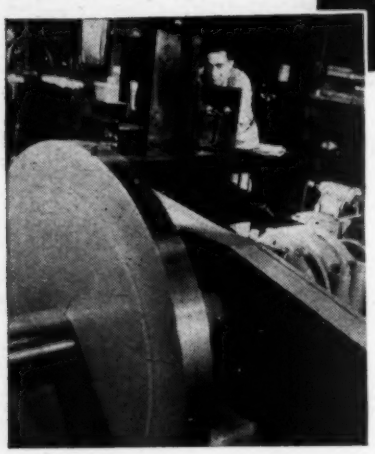

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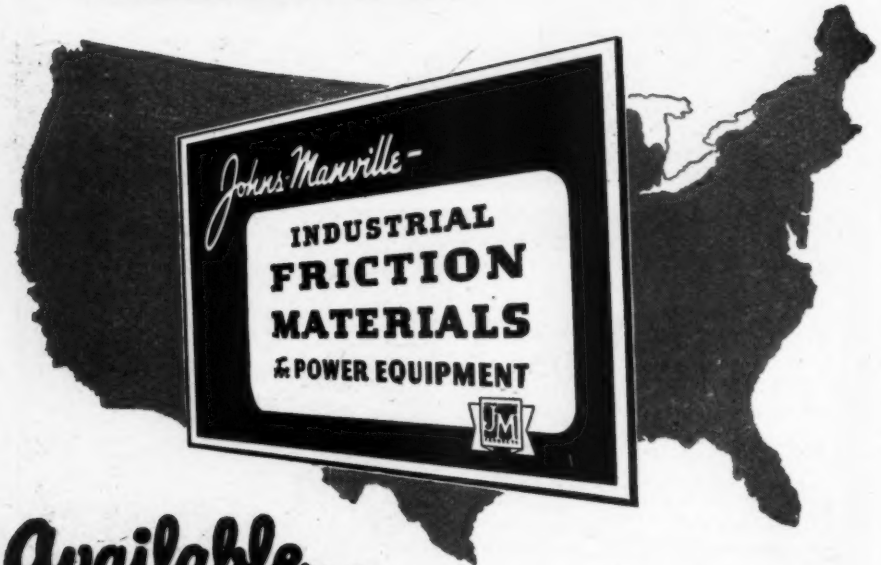

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INDUSTRIAL FRICTION MATERIALS

No. 1 With Leading Manufacturers

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Manufacturers and sellers of nonmetallic products who keep informed of *new* law suits have a good chance to win unavoidable suits. They *prepare* to win suits by conducting their business in view of knowledge they have learned by reading the cause and outcome of suits involving others in similar businesses.

Must Prove Injury

One who sues for compensation under the State Workmen's Compensation Act cannot recover compensation if he fails to prove definitely that the injury was the *sole* cause of the disability or death.

For example, in *Lewis v. Texas Employers' Ins. Ass'n*, 197 S. W. (2d) 187, it was shown that an employee of a plastering contractor had been engaged generally in carrying plaster to workmen on the job. The employee received a blow on his stomach while carrying a mortar board. The evidence showed that immediately upon receiving the blow to his abdomen, the employee dropped the mortar stand, held his side, seemed to be in pain. He ceased work for a few minutes but worked the remainder of the day. He did not return to work and died two weeks later. His widow sued to recover compensation under the State Workmen's Compeansation Act.

The widow failed to prove that the employee's death resulted solely from the injury, and the higher court refused to award compensation.

Perpetuity Void

According to a recent higher court a contract or deed is void which includes a clause to purchase merchandise at a definite price with no time limitation. Hence, it is perpetuity prohibited by law.

For instance, in *Brown v. Mathis*, 41 S. E. (2d) 137, reported March, 1947, it was shown that the Kirkpatrick Sand and Cement Company sold a tract of land The deed contained a clause that the Kirkpatrick Sand and Cement Company "reserves to itself its successors and assigns, the right to mine and take from said land all sand together with the necessary rights of going upon said land to secure same." The deed also specified that the company would pay to the purchaser of the tract ten cents per car for all cars of sand secured from the premises.

Later the purchaser of the tract sued to invalidate the clause on the grounds that the clause attempting to reserve the right to the sand is void and ineffective for the reason that it is an option with no time limit fixed for its performance and violates the rule against perpetuities.

The higher court agreed with this contention. In holding the deed clause void, the higher court said:

"The reservation clause was an attempt to reserve to the grantor (Kirkpatrick Sand and Cement Company) . . . . a perpetual option to purchase the sand

on the land described at the price of 10 cents per car, and constituted a direct violation of the rule against perpetuities."

Incompetent Driver

Considerable discussion has arisen from time to time over the legal question: Can a company be held liable for damages caused by an incompetent or intoxicated motor truck driver?

In *Krausnick v. Haegg Company,* 20 N. W. (2d) 432, the question presented the higher court was: Can the Haegg Company be held liable for injuries caused by its motor truck driver when its officials knowingly entrusted operation of the truck to an inexperienced or incompetent driver?

The higher court held that all motor truck owners are liable in damages for injuries caused by a person hired to drive the vehicle who is inexperienced or incompetent.

Notice Implied

According to a recent higher court the courts imply that property owners have legal notice of a defect that existed two years.

For example, in *Smith v. Kansas,* 146 Pac. (2d) 660, it was shown that a pedestrian sustained serious injuries when she stepped upon a defective lid of a manhole in a catch basin. This court held that the property owner was negligent and, therefore, liable in damages because witnesses testified that the lid had remained defective for two years.

Sales Tax

States are prohibited by the Federal Constitution from regulating commerce between states, and as a result, a "sales" tax *cannot* be imposed on sales made in interstate commerce, that is, on merchandise from one state into another state. However various states have enacted as a supplement to their sales tax a law known as a "Use Tax" which imposes a tax on goods coming into the state for use upon which the state sales tax has not been paid. According to a recent higher court if a state has been administering both the sales tax law and use tax law as one, a law which exempts the commodity or product from one tax automatically exempts the products from the other taxation law.

For example, in *Union Portland Cement Company v. State Tax Commission,* 176 Pac. (2d) 879, reported April, 1947, it was shown that the state of Utah adopted a law requiring payment of 2 percent on merchandise purchased or used. In other words, the sales and use taxes are each 2 percent of the purchase price. The Tax Commission administered the two laws as though they were one, and when the sale of certain property was exempted from the sales tax, it considered the use of that property was also exempted from the use tax.

Litigation arose whether the Union Portland Cement Company, located in Utah, must pay a 2 percent use tax on coal purchased and shipped from another state. On March 18, 1943, a state law was enacted which exempted coal from a sales tax. The higher court held that from this date the Union Port-

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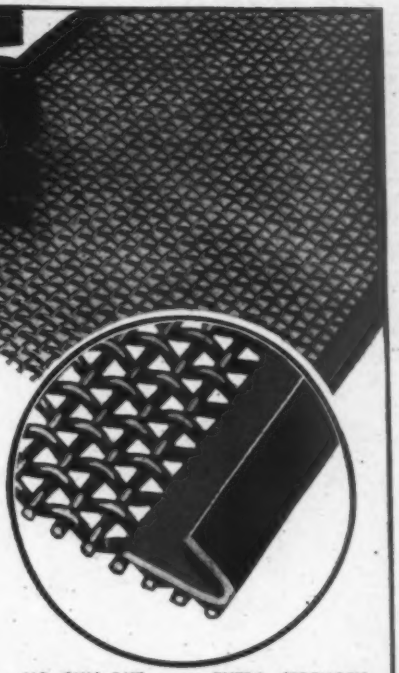

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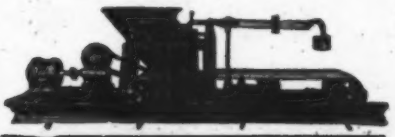

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land Cement Company need not pay a "use" tax on the coal it used in operation of its plant.

This late decision is unusually important because it is applicable to cement, lime, rock, sand, gravel, etc.

Manufacturer Breaches Contract

Under no circumstances may a seller repossess equipment purchased on installment payment plan, if he breaches or violates any clause in the contract.

For example, in *Brandtjen & Kluge, Inc., v. Pope,* 192 S. W. (2d) 496, the testimony showed facts as follows: A manufacturer in January sold certain machinery. The sale was made under a conditional sales contract. This contract *provided that in event the purchaser* defaulted on any installment, when due, this default would entitle the manufacturer to take possession of the equipment and keep all payments made by the *purchaser. The latter paid down* $214, and gave monthly notes for the balance due. The contract contained a clause to the effect that before the manufacturer would take possession of the equipment he would notify the purchaser.

A disagreement arose when the purchased notified the manufacturer that by reason of defects a part of the machinery would not work automatically. The manufacturer demanded that the purchaser make the agreed monthly payments but the latter refused to do so. Then the manufacturer wrote the purchaser that he would sue under the contract immediately because of the purchaser's failure to pay the notes. However, the manufacturer did not state in this letter that he intended to repossess the equipment.

Soon afterward the manufacturer filed suit and took possession of the presses and equipment. Then the purchaser sued the manufacturer for $225 as damages for the loss of use of the equipment. The purchaser contended that the manufacturer had no legal right to take possession of the equipment *because* he had *not* complied with the above clause in the contract which required him to notify the purchaser of these intentions.

The manufacturer contended that his letter was proper and legal notification, but the higher court refused to agree with the manufacturer and held the purchaser entitled to recover $225 damages. Also the court ordered the manufacturer to return the equipment to the purchaser, and said:

"The principle is that it is a plain matter of contract, and the parties are entitled to have the contract enforced according to its terms . . . . We are of the opinion that the letters from the complainant (manufacturer) did not constitute notice of an intention to accelerate."

Two Innocent Persons

All courts have adopted this rule: Where one of two innocent persons must suffer from the wrongful act of another the loss must fall upon the one *making* the loss possible.

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See *Walsh v. Hunt,* 52 P. 115, where one Hughes was authorized by Willis to negotiate a loan for $500, with which to pay off an existing obligation. Thereafter Hughes presented for Willis' signature a note and mortgage which he executed in pencil. Later Hughes erased the pencil words and figures and wrote in lieu thereof with pen and ink twelve hundred dollars.

This higher court held that the lender could recover $1,200 from Willis upon the theory that the latter was guilty of negligence in executing the documents written in pencil, thus enabling Hughes to perpetrate his fraud.

Hence under no circumstances should any one sign a contract or other instrument whose body is written *in pencil.*

Danger Obvious

If an employee is injured by a device or thing known by the employee to be dangerous, he cannot recover damages from his employer.

In *Perry v. Herrin Brothers,* 35 S. E. (2d) 883, it was shown that an employee sued his employer to recover damages for injuries received when he slipped and fell on a narrow platform. The higher court refused to hold the employer liable in damages, saying:

"If any dangerous conditions existed in connection with the platform, such conditions were obvious, and the plaintiff (employee) was thoroughly familiar with the situation . . ."

Thus, this court established the law that where a dangerous condition or defect is known by an employee, the latter assumes the full risks connected with the employment.

Vibrating Machine

It is well established law that although a company has operated a manufacturing business in the same location for many years, it cannot install new machines or equipment closer to private dwellings, or more annoying than previously used machines.

For example, in *Finn v. Pasquini,* 49 Atl. (2d) 858, reported February, 1947, it was shown that a company has been manufacturing concrete blocks for 25 years, using manually operated machines. The company decided to install a vibrating machine which "makes a noise of a different character, not unlike that caused by the operation of a sawmill."

A property owner filed suit and asked the court to grant an injunction to prevent the company from installing the new vibrating machine on the grounds that its operation would be a "nuisance" in the neighborhood. The higher court refused to grant the injunction but indicated that although the company could continue using the same equipment it had previously used, yet if the new vibrating concrete block machine proved to be a "nuisance" to persons who lived in nearby homes, the lower court must issue an injunction against its use. The higher court also indicated that until the testimony proved that the machine was a nuisance the company could operate it 37 feet, 2 inches distant from the

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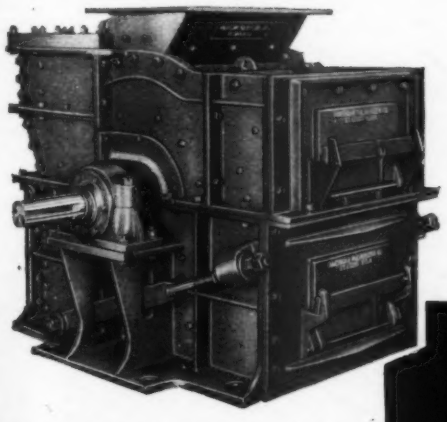

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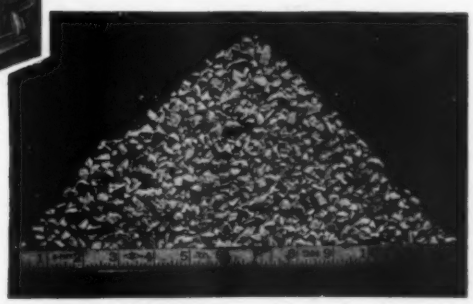

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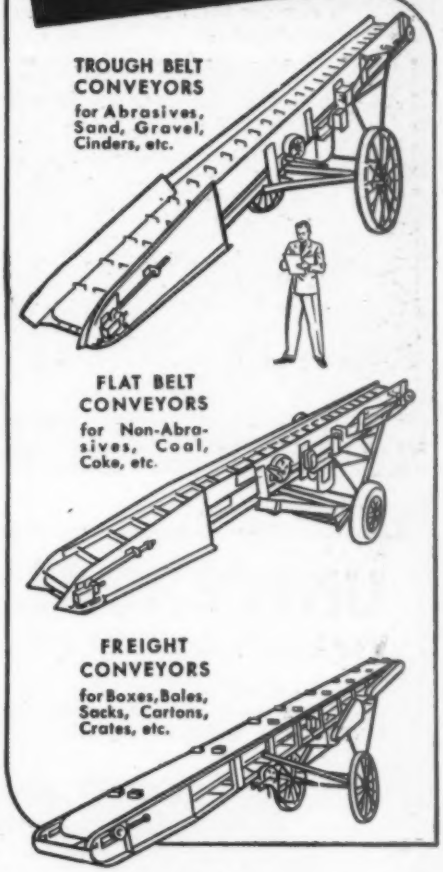
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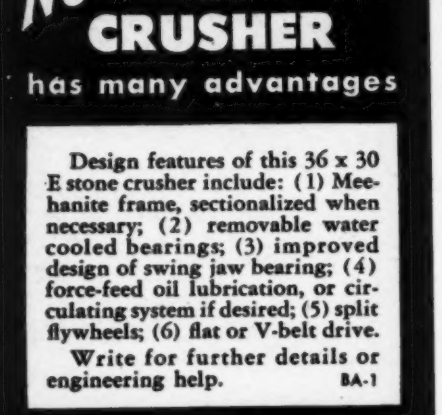

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division line between the nearest private residence, if the company provided rubber cushions between the metal parts of the machine which vibrate, and run only between 7 a.m. and 7 p.m.

Previously, the old concrete block machine had been operated 37 feet from the nearest dwelling. Hence, the higher court based its present decision on the fact that if the new machine was no more annoying to home owners than the old machine, the company could continue to operate it in the same location. This court said:

"It may be that, since it found that the new machine would produce no more noise than the old machine, installation of the new at the site of the old machine was deemed unobjectionable by the (lower) court."

Questions and Answers

Legal Editor, PIT AND QUARRY: Please inform us whether we can cancel a contract on the grounds of restraint of trade. The manufacturer gave us a contract containing a clause that he would not sell certain merchandise to our competitors. We desire to cancel this contract and will appreciate your advice. A. C.

Answer: Modern higher courts consistently hold that fraud and illegality of contracts, on the part of a seller, effect the same result to the purchaser who may, in either event, rescind the contract.

All contracts are illegal which violate any valid law. Obviously, therefore, a great variety of sale contracts are void. However, one classification of contracts erroneously believed by many to be void relate to the restraint of trade. While certain contracts in restraint of free trade are unlawful, others of this nature are valid.

Modern higher courts hold that unlawful restraint of trade contracts are those which (1) impose undue hardships upon the person restricted; (2) have for their purpose the creation of a monopoly; (3) are intended to control prices; (4) limit production artificially; (5) unreasonably restrict the alienation or use of any merchandise; (6) are based on a promise to refrain from competition and are not ancillary either to a contract for the transfer of good-will or merchandise. All other restraint of trade contracts are valid.

For instance, in *Harris v. Marra,* 29 Atl. (2d) 64, it was shown that a company is engaged in the manufacture and sale of cutting apparatus. It made a contract with a distributor which contained a clause to the effect that the company would not sell similar equipment to certain named firms and competitors of the purchasers. Later the higher court held the contract valid, and said:

"Neither do we find any merit in the suggestion that the agreement tended to create a monopoly or to control prices. Certainly a manufacturer can operate through distributors, choose his agents and prescribe how the business shall be operated without creating a monopoly."

It is improbable that you can avoid fulfilling the terms of your contract.

TRAFFIC News Digest

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 83803 (2)—Sand, all kinds and gravel, carload, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Blissfield to Bellsville, O., rate of 105 cents per net ton.

Docket 83833 (2)—It is proposed to establish on, from Georgia, Ind., to Bicknell, Ind., rate of 110 cents net ton, subject to Ex Parte 162 increase on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply.

Docket 83834 (1)—It is proposed to establish on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Orleans, Ind., to Greencastle, Ind., 105 cents net ton, subject to Ex Parte 162 increase.

Docket 83842 (1)—It is proposed to establish on sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding, or polishing, loam, moulding or silica) and gravel, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Rittenours, O., to Evans, W. Va., 143 cents; Parkersburg, W. Va., 121 cents net ton, subject to Ex Parte 162 increase.

Docket 83862 (2)—Proposed to establish on crushed stone, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from North Baltimore, O., to Edgerton, O., 105 cents net ton, subject to Ex Parte 162 increase.

Docket 83864 (1)—It is proposed to establish on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Georgia, Ind., to Boonville, Rockport, Ind., 121 cents; Huntingburg, Ind., 99 cents net ton, subject to Ex Parte 162 increase.

Docket 83880 (2)—It is proposed to establish on, from Ballard, W. Va., to representative Virginia Railway stations in West Virginia rates shown in Exhibit A, on sand and gravel, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply:

Exhibit A

To Va. Ry. Stations, in West Virginia (Representative) Main Line	Rates in Cents per Ton of 2000 lb. (subject to Ex Parte 162) Proposed Rate
Kellysville	165
Princeton, Matoaka, Algonquin	154
Herndon, Bud, Dearfield, Tralee	143
Guyndot River Line	
Itmann	143
Glover, Mile Post 19, Aliff, Shannon	154
Oceana, Gilbert	165
Winding Gulf Branch	
Black Eagle, Wyco, Stephenson	143

Docket 83922 (2)—It is proposed to establish on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of the marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply:

From Georgia, Ind., to	Subject to Ex Parte 162 increase
Huey, Ill., Sandoval, Shattuc, Ill.	119 cents
Odin, Salem, Ill.	110 cents
Summerfield, Ill.	124 cents

Docket 83930 (2)—Proposed to establish on limestone, agricultural, unburned, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply.

From Georgia, Ind., to	Subject to Ex Parte 162 increase
Breese, Ill.	$1.10 net ton
Shattuc, Ill.	.99 net ton

Docket 83935 (2)—Limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds. Establish on, from Conneaut, O., to representative points in New York, Pennsylvania and West Virginia, shown in Exhibit C:

Exhibit C

	Subject to ExParte 162 increase *Proposed rates in cents per 2000 lb.
Ambluco and Mapes, N. Y.	204
Anawalt and Filbert, W. Va.	336
Beaver Dam and Freeman, N. Y., Knoxville, Pa.	226
Black Creek, N. Y.	187
Cameron Mills, N. Y.	215
Hinsdale, N. Y.	182
Wilco, W. Va.	325

*ICC docket 25220 Carriers Revised scale.

ILLINOIS FREIGHT ASSOCIATION DOCKET

Docket IRC 511-613—Stone, viz.: stone, ground, or pulverized, crushed, or rough quarried; also strippings of stone quarries in straight or mixed carloads, from Prairie du Rocher, Ill., to GM&O Railroad stations:

To (Representative)	Present	Proposed
East Louisiana, Ill.	122 cents	133 cents
Delhi, Ill.	102 cents	113 cents
Whitehall, Ill.	113 cents	124 cents
Upper Alton, Ill.	83 cents	94 cents
East Hardin, Ill.	146 cents	157 cents
Cooke, Ill.	132 cents	143 cents
Kaser, Ill.	119 cents	130 cents
Springfield, Ill.	108 cents	119 cents

Subject to Tariff X-162.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Docket 42555 (2)—Lime, Mosher and Ste. Genevieve, Mo., to Franklin (Warren Co.), O. To amend Agent Jones' Tariff 516-J, I.C.C. 3832, by revising the rates on lime from Mosher and Ste. Genevieve, Mo., to Franklin (Warren Co.) O., as follows:

Column A—Minimum weight 30,000 pounds ..... 20 cents
Column B—Minimum weight 50,000 pounds ..... 16 cents

TRUNK LINE ASSOCIATION DOCKET

Docket 44351 (shippers) — Limestone, crude, fluxing, foundry and furnace, when shipped in open-top equipment, carloads, minimum weight 90 percent of marked capacity of car, etc., to Syracuse, N. Y.

From	Per Gross Ton Subject to ExParte 162 increase
Martinsburg and Inwood, W. Va.	$2.96
Bittinger and Thomasville, Pa.	2.81
Lebanon Valley District Stations Annville, Lebanon, Myerstown, Palmyra and and Swatara, Pa.	2.58

Reason: On same basis as rates applying from and to other points.

Docket 44352 (shippers) — Limestone, crude, fluxing, foundry and furnace, carload minimum weight 90 percent of marked capacity of car, etc., but not less than 80,000 lb.; from Chazy, N. Y., to Rumford, Me., $2.86 per net ton (subject to Ex Parte 162 increase), in lieu of current sixth class rate. Reason: On same basis as rates applying from and to other points.

Docket 44390—Limestone, crude, when loaded in open-top equipment, carload minimum weight 90 percent of marked capacity of car, etc., provided that orders will not be accepted for, open-top cars of less marked capacity than 80,000 pounds, from Stevens City, Va., to Covington, Va., $1.49 per net ton (subject to Ex Parte 162 increase), in lieu of current sixth class rate of 22 cents per 100 pounds. Reason: Comparable with rates applying from other points in the immediate vicinity.

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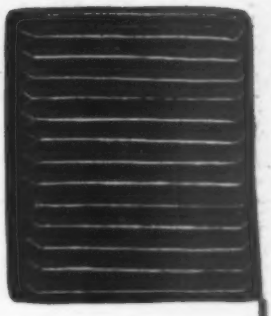

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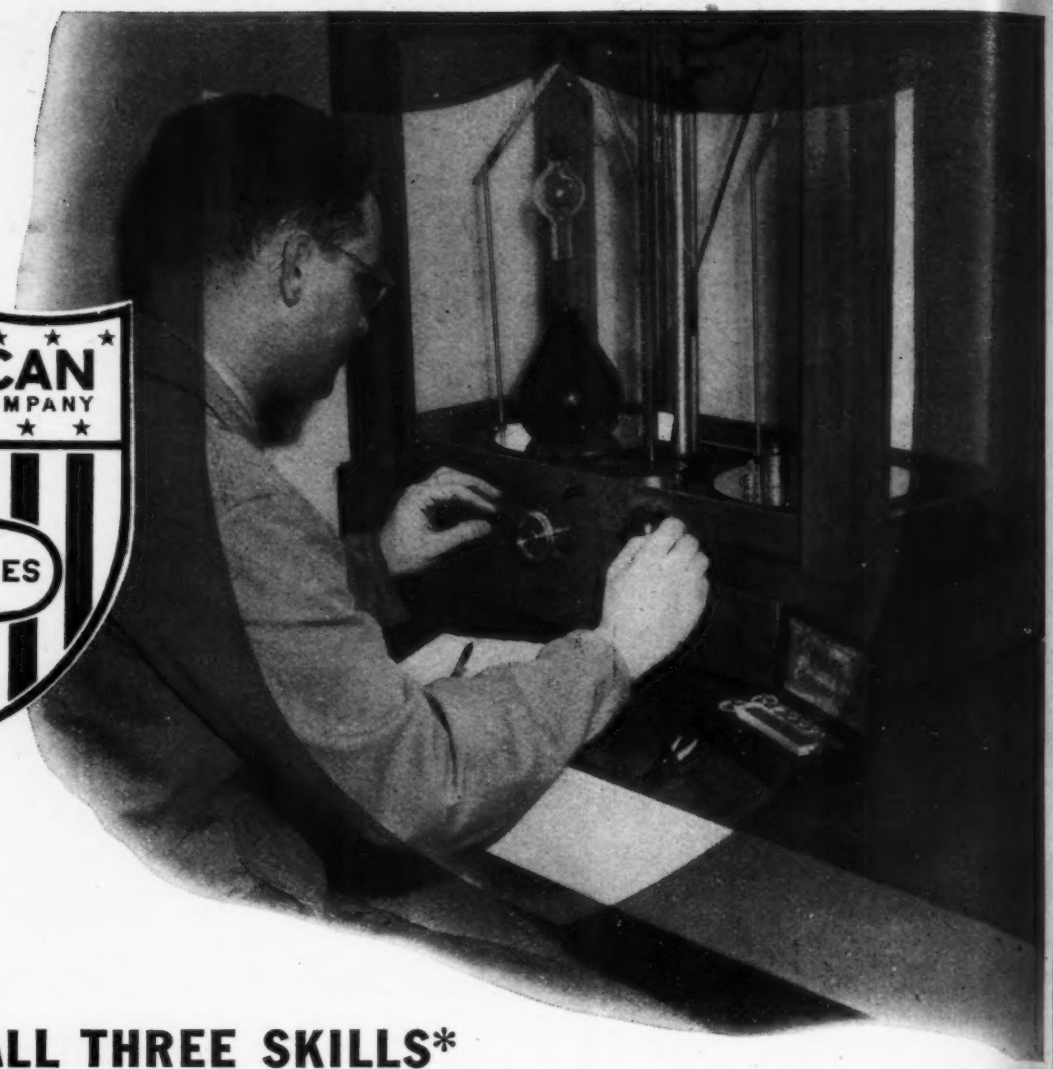

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NEWS OF CONCRETE MANUFACTURERS

A.C.P.A. Loses Geo. Sokol, Founder-Member and Its First Secretary

George Sokol, one of the founders of the American Concrete Pipe Association in 1907 (then named the Interstate Cement Tile Association), died on July 20 at his home in Sibley, Ia., at the age of 67 years.

At the organization meeting of the association Mr. Sokol was elected secretary. He was associated with his father, the late F. J. Sokol, in the operation of the Sibley Cement Company and the Shell Lumber Company. For many years he was president of the former concern.

Nebraska C.M. Association Publicizes Concrete Blocks

The newly-organized Nebraska Concrete Masonry Association has launched an advertising campaign to promote the use of concrete masonry in homes in Nebraska. Typical copy to be used:

"Enjoy the priceless protection of a firesafe CONCRETE MASONRY HOME. . . When you build a house of enduring concrete masonry, you have a home worthy to shelter your loved ones safely—to protect your most cherished possessions, your finest furnishings. . . We'll gladly give you complete information on how to get a firesafe concrete block house designed to fit your needs and your location. . ."

Advertising will carry the phrase, "To be sure of quality—buy from a member of the Nebraska Concrete Masonry Association."

Lavalite Products Company Buys Site Near Pumice Beds

Property rights were recently awarded to the Lavalite Products Company of Tacoma, Wash., to begin yarding and stockpiling pumice on a 30-acre tract near Olequa, Cowlitz County, Wash. The Tacoma concern owns an extensive pumice deposit at Mt. St. Helens from which pumice will be taken to the new location for storage. Officials indicated that the work would begin at once, in order to stockpile a sufficient amount of material before winter.

Lavalite operates a plant at Tacoma, where various types of pumice building products are made under patented processes. The company may eventually build a similar plant at the Olequa site.

Coming Events

January 21-23, 1948 — Cincinnati. 18th annual convention and exhibit, National Ready Mixed Concrete Association, Netherland Plaza Hotel.

Entries for Noble Competition Must Meet Nov. 1 Deadline

The accompanying picture of Thomas W. Noble, founder of the Thomas W. Noble Award, arrived too late to be published in our September issue in connection with the notice of the National Concrete Masonry Association's annual competition.

Thomas W. Noble

Mr. Noble's award of $500 is presented annually to the "owner, employee or group of employees . . . submitting the most meritorious contribution in the production or merchandizing of concrete masonry units." There is still time to enter the contest. Entries must be received at the N.C.M.A. offices, 38 S. Dearborn Street, Chicago, Ill., not later than November 1, 1947.

Demand Outstrips Production At Washington Block Plant

Four years of experimenting with pieces of pumice from the Red Mountain Road near Leavenworth, Wash., resulted in a business venture which has become one of the leading industries of that city. Pumice Stone Products Company, owned and operated by Joe Scholze, is now turning out pumice blocks at full capacity, and still the demand for these light-weight units cannot be met.

Block-Tile-Brick Production Begins at New Plant of Mitchell Concrete Products

A new industry went into production at Mahomet, Ill., when Mitchell Concrete Products, Inc., began turning out concrete brick, drain tile and block. Year-round production is anticipated after the installation of a boiler for steam curing.

Robert D. Mitchell, proprietor, stated that his equipment has a capacity of from 15,000 to 16,000 brick per day. The units will be available in several colors.

Kingsport Block Company To Operate Second Plant

At Whitesburg, Ky., the Kingsport Block Company has purchased the plant of the Cumberland Heating and Block Company, which will be known as the Kingsport Block Company's Plant No. 2.

Production of concrete and cinder blocks and bricks will begin as soon as the newly-acquired facilities have been remodeled and equipment has been installed. In charge of sales is Walter S. Ramey; Ronda R. Tyall will supervise production.

Hesler & LaRue, Inc., Begin Production of Concrete Block

Hesler & LaRue, Inc., Evans Mills, N. Y., has begun production of cinder and concrete blocks at a capacity of 2,000 blocks per day, according to officials of the company. The new firm has been capitalized at $50,000.

William H. Hesler is president of the company, Benjamin H. Hesler, Jr., is vice-president and Edward J. LaRue, secretary-treasurer. The plant is equipped with a Stearns block machine and has a railroad siding.

Cataphote Expands Territory For Darex AEA Distribution

John A. Williamson, manager of the Cement Products Division of Cataphote Corporation, Toledo, O., has announced that additional territory has been added for the distribution of Darex AEA (air-entraining agent).

Cataphote Corporation, now distributing in Ohio, Indiana, Michigan and Kentucky, will add Tennessee, Alabama, Mississippi and Florida to its territory.

At Natchitoches, La., Acme Cement Products has announced plans for the erection of a $95,000 concrete block plant.

Block Plant in Philippines Equipped with Machines Ordered from U. S. Firm

Snapshots taken of war destruction in the Philippines by an American naval officer and a later chance meeting of this veteran in Columbus, O., with a native of the islands have enabled the Universal Concrete Pipe Company to assume an important role in post-war reconstruction work there.

When J. M. Millious, advertising and sales promotion manager for Universal, returned from overseas duty in the United States Navy, he became acquainted with Augusto Sevilla. Mr. Sevilla, Ohio State University ceramic engineering graduate, spent many hours over Millious' photos of war havoc in the islands. It developed that Millious had known members of Sevilla's family in Manila.

When Mr. Sevilla returned to the Philippines, he and his father formed the Philippine Concrete Products Company. Soon they needed cement block machines, and Mr. Sevilla turned to his Columbus friend for help. Machines made with special mold boxes to form a brick-type block not ordinarily used in this country were made for the Sevillas by Universal. They were shipped to Manila via New York City and American President Lines. The total order was $35,000.

A part of the business in connection with the transaction has been conducted by Millious and Sevilla by telephone—at odd hours of the night because of the time difference between Manila and Columbus.

The Sevillas have purchased their own sand-and-gravel deposit and built their plant near it. The buildings are situated on the Marikina River, which will be used by the company's barges for shipping block to Manila. Power for the plant will be furnished by two 250-kv.a. diesel generators, and the sand and gravel will be excavated by a power shovel.

Current prices of concrete block in this area of the Philippines are as follows (quoted by Mr. Sevilla): 4- by 4- by 12-in., 12½ cents; 4- by 6- by 12-in., 17½ cents; 4 by 8- by 12-in., 22½ cents. The firm already has orders for block for 20 new houses and apartments, and the Philippine Secretary of Public Works has assured the owners that quantities of their block will be used in future construction of government buildings.

The National Ready Mixed Concrete Association, Munsey Building, Washington 4, D.C., is sending a questionnaire to its members requesting information about the mixer or agitator trucks used by them. The resulting information will be used for the benefit of the industry as a whole. Any non-member producer who is willing to fill out such a questionnaire is requested to write to the association at once for a copy.

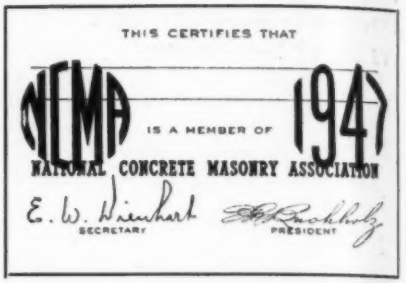
New Equipment Purchased For Layrite Block Plant

The Layrite Concrete Products Company, operating plants in Seattle, Spokane and Kennewick, Wash., has purchased a new Flam automatic block machine and a 50-cu.-ft. Flam mixer for installation, probably at a location in central Washington.

The new machine will mold eight 8- by 8- by 16-in. units at a time on a plain pallet.

N. C. M. A. Issues Cards For Identification of Member Company Officials

For the first time in its history the National Concrete Masonry Association is issuing identification cards for the use of member company officials. Cards for the current year have already been



mailed in accordance with the names of official representatives listed in the association's membership roster. Additional cards will be isssued to qualified members upon request.

According to E. W. Dienhart, secretary of N. C. M. A., it is hoped that members will use the cards for identification at the annual and district meetings.

New Use for Concrete Blocks Featured by Ohio Association

The Columbus Concrete Block Manufacturers Association, Columbus, O., introduced a new type of sign at the Ohio State Fair, August 23 to 29 at Columbus.

It was the first of several such signs planned for the Columbus area, and was constructed of concrete block at a heavily-traveled intersection on the Ohio State Fair Grounds. It is estimated that at least 50,000 of the 346,000 total attending the fair viewed the sign, one or both sides.

Over-all dimensions are as follows: length, 26 ft. 8 in.; height, 10 ft. 8 in. with display space measuring 22 ft. 8 in. on each side. At either end 24-in. pilasters provide additional support to wall sections built of 12-in. block. Approximately 300 12-in. and 100 8-in. block were used in construction. The sign rests on a concrete footer 12 inches deep and 20 inches wide.

The surface was painted with ivory waterproof cement paint, the display space being white. Copy was painted on this surface in red, blue and black. The word "Firesafe" was painted in red. Names of manufacturer members of the association are on the front showing. The back showing has a section of pre-cast concrete silo set up at one side.

Signs of this type, it is stressed, are firesafe, stormsafe, rotproof, and verminproof, and have low maintenance cost. They can be built to any required dimension, and floodlighting can be easily provided overhead by running outlets through the hollow block cores, thus simplifying installation and providing protection for and concealing the wiring. During the fair the sign was floodlighted at night. The sign is visible from two streets bordering the fair grounds and will remain on the location indefinitely.

- **Left: Front showing of the concrete block sign at the Ohio State Fair.**
- **Right: Back showing of the sign.**

Eastern Firm Features Streamlined Method Of Home Construction

Attractive, all-concrete houses that can be poured at the rate of one and one-half a day, at an extremely moderate cost with only two sets of forms, called "Atlas Speed Forms," been developed by the Irvington Form & Tank Corp., Irvington, N. Y.

The forms are supplied in complete sets for pouring an entire house, including exterior walls, interior walls and roof. They are of steel, made up of units assembled with wedge bolts and clips. Studding is not required, a fact which accounts for the savings in labor in erecting, stripping and moving, as well as in material. Wale seats which are assembled to the forms carry walers of 2- by 4-in. lumber. Standard snap wall ties keep the forms the specified distance apart and tie wedges secure the walers. Steel angle walers or wood walers may be used. The only support usually needed is an occasional strong back on one side of the wall only.

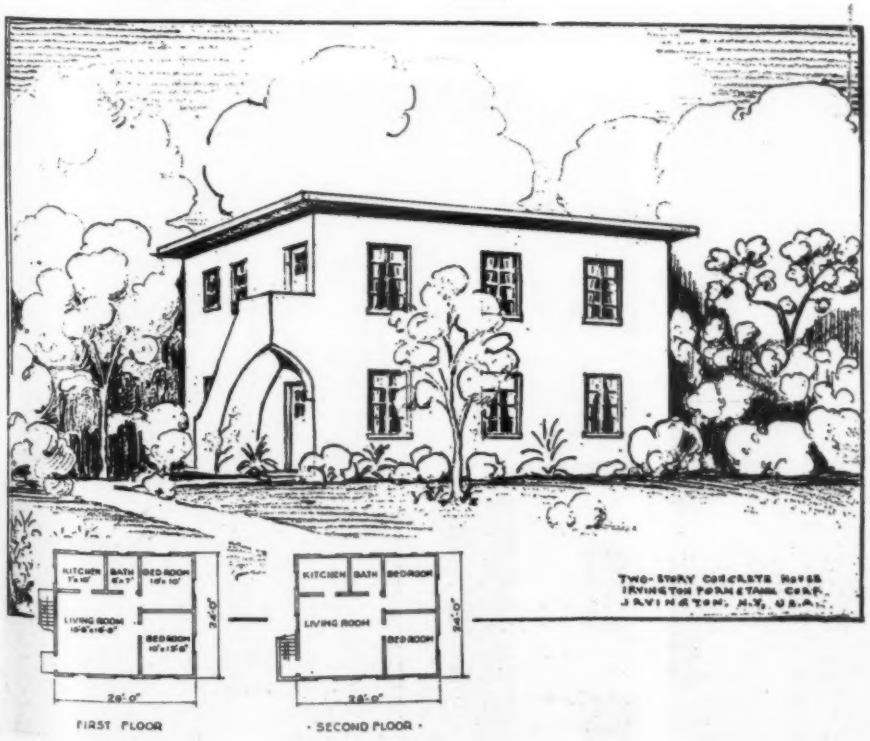
The steel slab forms used for the roof do not require joists, nailing or other fastening for support. The steel slabs lie flat on girts and the panels, when laid together, form a tight joint through which no concrete will pass. When built in quantities of 100 houses or more, the cost per use per house should be very nominal in most areas, about $140 for a one story house or $180 for one of two stories.

Considerable interest has been shown in the new system, both in the United States and abroad, particularly for large-scale workers' housing projects in locations having a warm climate, such as our Southern states and South America, where no cellar would be required. It is, however, a simple matter to build a solid, water-proof cellar with these steel forms. In fact, contractors are using them extensively for this purpose, and get one foundation in a single day, every day of the week, with only one set of forms. As they are stripped from one foundation, they are quickly set up for the next.

Though made in standard units the steel forms have flexibility and lend themselves to arrangement for a variety of architectural treatment. One design resembles a clapboard finish.

Although made of steel the form units are light in weight so that any workman can set, move and strip them easily and rapidly; they can be used indefinitely without repair. Over 100 houses can be poured with one set of forms.

•One type of home which can be built with steel forms.



Ornamental Tile Featured By Portland, Ore., Firm

Among the new industries of Portland, Ore., is one whose product is both unusual and beautiful—the Mosaic Tile Company, which manufactures ornamental concrete and terrazzo tile.

Founder and president is C. H. Nelson, who is also manager of the plant. Associated with Mr. Nelson is L. C. Rulifson, who is in charge of production. Hydraulic-pressure concrete tile is made in plain colors or in multi-color designs and patterns on order. The tile is said to be fade-proof and stain-proof. The tints are derived from metallic oxide colors which are imported from Europe.

After the curing period the tile is inspected and subjected to hardness tests of 4,000 p.s.i. Mr. Nelson states that although the process has been known for about 75 years in foreign countries, it is relatively unfamiliar in the United States.

New Process Announced At Rutgers for Making Fly-Ash-Slag Brick

Dr. John H. Koenig, director of the New Jersey ceramics research station at Rutgers University, has announced the development of a new process for making building bricks from slag and fly ash. Dr. Koenig stated that the outstanding economic aspect of the new process is the fact that the location of raw materials is in areas where the demand for the product is the greatest. He added that utility companies alone produce approximately 2,000,000 tons of fly ash and slag annually.

The process, according to Dr. Koenig, was developed by William H. Bauer, a Rutgers alumnus. Mr. Bauer perfected the process after two years of study under a graduate fellowship grant sponsored by G. & W. H. Corson, Inc., of Plymouth Meeting, Pa. Two favorable features of the process were mentioned—the fact that the machinery now in use in brick plants can be utilized for the new material and the possibility that further development of the slag-fly-ash brick may lead to improved control of the smoke nuisance.

Universal Concrete Pipe Co. At Columbus, O., Making Block

Universal Concrete Pipe Company's president, H. X. Eschenbrenner, has announced that the Columbus, O., plant is now producing concrete block. Heretofore the manufacture of block has been restricted to certain others of the company's 15 plants, which are scattered through 8 states.

At the Columbus plant, in charge of Manager Ted Cochran, machinery for the manufacture of pipe and block is made, in addition to concrete and pipe cribbing.

Bartile Machine Featured In New Promotion Campaign

The E. P. Barber Company, Bloomington, Calif., manufacturers of the Bartile roofing machine have issued a four-page folder featuring this product as the first move in a newly-launched merchandising program.

The brochure explains the process of laying a Bartile roof without the use of nails, screws, wire, solid sheeting or waterproof paper roofing base. The Bartile units are self-locking, lightweight and fireproof. Present plans envision the possible use of national publications for further advertising. L. E. Harrington is Bartile's national sales director.

William A. Zicos, 37, a co-owner of the Fairfield Concrete Company, Fairfield, Ill., died unexpectedly on July 21. He had driven one of his company's trucks loaded with concrete to a local locker plant. As he stepped from the truck and reached for the lever to dump the load, he collapsed.

Missouri Producer Creates Own Market For Concrete Blocks

By WALTER E. TRAUFFER

• The plant of the Westport Building Material Co., with paved storage yard at right.

another ON THE SPOT report

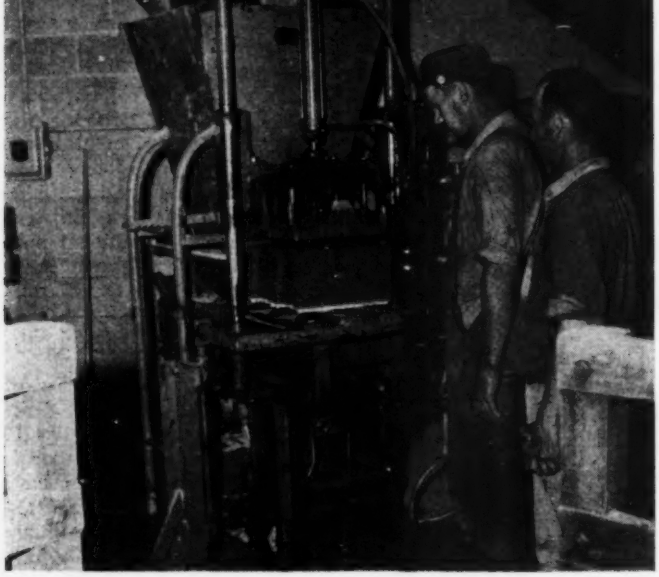
IN the last few years the demand for concrete blocks has increased so rapidly and new plants have sprung up in such numbers that it would be difficult to find a community of any size which does not have at least one plant. This nevertheless, seems to have been the condition in the city of Springfield, Mo., (population 70,000 now, 60,000 ten years ago) until July, 1945, when the Westport Building Material Co. put a new plant in operation. Now there are five plants in that city.

The history behind this plant is interesting. W. G. Ruckle, owner, came to Springfield in 1933 from Wichita, Kan., where concrete blocks were even then widely used. Entering the real estate business he found that building materials were scarce around Springfield—no clay bricks or concrete blocks were made nearby. One reason for the latter was that no good sand was available locally. Also the limestone abounding in this area was so near the ground surface and the groundwater pressure was so high that few houses had basements, and this was at that time the chief outlet for blocks.

Mr. Ruckle therefore occupied himself with his real estate business until the war was over but then decided to go into the manufacture of concrete blocks in spite of these difficulties, because of the need for a good building material. Springfield was not in a critical area during the war and there is a serious housing shortage. The sand used is shipped in from Tulsa and Kansas City. Mr. Ruckle opened his own quarry to provide crushed stone which is preferred there for concrete but must compete with gravel and chats from the Tri-State zinc mines. No lightweight aggregate is yet obtainable in this area, and Mr. Ruckle thinks this is necessary for further expansion of the block business.

A tamper machine was first set up in the open to make the blocks for the plant and there was an im-

• Two views of the new hydraulic block machine which combines vibrating and tamping action. The illustration at the right shows a 2-block pallet being carried off with special hand plates.



• The tamper block machine which is used to make large sizes and special shapes.

mediate deluge of orders. More than 40,000 blocks were on order before the plant went into operation with its two tamper machines, a Miles and an Anchor. For a time the demand made two-shift operation necessary until May, 1947, when one of the tampers was replaced with a George hydraulic Super-V machine which combines vibration with tamping action and has considerably increased the plant capacity. It has never yet been necessary to crowd this machine but it readily makes 3,000 standard 8- by 8- by 16-in. blocks in 8 hours, with the operator and two men offbearing. Ordinarily only one offbearer is used because the one-shift capacity of the machine even then exceeds that of the curing rooms, and the capacity is then over 2,000 blocks daily. Additional rooms are to be built as soon as possible.

The company's quarry is 1½ mi. from the plant and sand is received in cars on a siding 1 mi. distant. Trucks are used to haul both materials to the plant, where they are discharged into hoppers. From these the sand is fed by a short feeder conveyor, and the stone by gravity, to a 40-ft. enclosed bucket elevator. From this the materials are discharged into a 30-ton, two-compartment bin.

The aggregates are discharged by gravity from the bins into individual volume batchers over the mixer. Mirrors placed overhead enable the operator to fill the batchers accurately up to lines marked inside them. The aggregates are then discharged into the Besser 12-cu.-ft. mixer and cement is added from sacks. Air-entraining cement is stored on the mixer floor. On the floor below white and mortar cements, lime, plaster, etc., are stored for sale to customers.

The concrete is discharged from the mixer through a turntable spout on rollers to either of the two block machines. The George vibrator machine makes two standard 8- by 8- by 16-in. blocks, also bull-nose, casement and steel sash blocks in any desired height. If desired it can make one standard block and two partition blocks at one time.

The Miles tamper machine is used to make blocks more than 8 in. high, ashlar face units, rock-face blocks, etc. Molds are now being made for the manufacture of silo blocks by this machine. These will be made for 12- and 14-ft. dia. silos, and steel reinforcing cages will be used with a vertical bar every 4 ft. of circumference and a circular bar every 4 ft. of height. There have been many inquiries for silo blocks.

George aluminum pallets are used on the vibrator machine and, while they are a little more difficult to clean than steel, they are, according to Mr. Ruckle, much easier to handle and stack. Wood pallets are used for the tamper machine. The offbearer uses special George hand plates for handling the blocks from the machine which make the job easier and reduce the amount of breakage.

The machine and curing room floors and the storage yard are downgrade ⅛ in. to the foot which makes for good drainage and for ease of handling loaded racks. All handling is done with two jack lifts, one a Yale and the other a Weld-Bilt made by the West Bend Equipment Co. There are five curing rooms each with a capacity of 40 racks; a rack holds 50 blocks. Steam is supplied by a 15-lb. stoker-fired boiler. The yard has concrete runways and a capacity of 50,000 blocks.

Air-entraining cement has been used exclusively in this plant since it was built and standard mixes are used. The crushed limestone used is graded from ⅜- to ⅛-in. in size with a maximum of 5 percent dust. The river sand is graded down from the 8- mesh sieve. A mixture of 40 percent stone and 60 percent sand is used and 22 blocks are obtained per sack of cement. The cured blocks weigh 40 lbs. and are 3-cell units measuring 7¾- by 7¾- by 15¾-in. with 1¼-in. exterior and 1-in. web walls. Absorption and strength tests are made periodically and these surpass accepted standards. The block tests average well over 1600 lb. for compressive strength at 28 days. A small amount of calcium chloride is used, especially in cold weather. The blocks are steam cured for 24 hours and yard cured for 28 days before being sold.

While concrete blocks have met with immediate acceptance in this area, there is, according to Mr. Ruckle, a need for much educational work. Most of the blocks made to date have been used for foundations, industrial building, etc., but it is still difficult to sell blocks for exposed walls for houses and other purposes. One step in promoting blocks has been an exhibit at the State Fair. In 1946 a waterproofed concrete block water tank was shown which attracted much attention. The next step will be to build a series of model houses.

• Left: W. G. Ruckle at right.
• Right: The 2-compartment volume batcher, with mirrors placed above so that the operator can fill them accurately to lines marked inside.

National Ready-Mixed Concrete Assn. Directors Honor Stephen Stepanian

another ON THE SPOT report

THE semi-annual meeting of the board of directors of the National Ready Mixed Concrete Assn. was held August 14 at the French Lick Springs Hotel, French Lick Springs, Ind., following the meeting of the board of the National Sand and Gravel Assn. on August 12. F. P. Spratlen Jr., president of the association, called the meeting to order and then told of the series of regional meetings from coast to coast which he attended with Vincent P. Ahearn, executive secretary. These meetings were so well received, he said, that they should be held twice each year, with Mr. Ahearn attending one series and Stanton Walker, research director of the association, the other.

1948 Annual Convention Mr. Ahearn then outlined plans for the next annual convention to be held at the Netherland Plaza Hotel, Cincinnati, January 21 to 23, 1948. The sand and gravel board is to meet on the morning of Monday, January 19, and the ready-mixed concrete board will meet in the afternoon, following a joint luncheon. The machinery exhibit, the first to be held since the war, will be opened on Tuesday morning, January 20. The first sand and gravel meeting will also be on January 20, and the first ready-mix meeting Wednesday, January 21. Mr. Ahearn also said that no evening affairs will be held except the annual reception of the manufacturers division of the N. S. G. A. Wednesday evening, January 21. An outstanding personality will be speaker at the annual luncheon on Thursday, January 22.

Later Meetings The 1949 convention, as announced earlier, will be held in New York at the Hotel New Yorker the week of February 14. The location of the 1950 convention has not yet been decided, but it will probably be held in St. Louis or Chicago, where adequate facilities for a machinery exhibit are available. The 1951 annual convention will be held at the Roosevelt Hotel, New Orleans, the week of February 11. Mr. Ahearn also announced that the sand and gravel directors had chosen the Broadmoor Hotel, Colorado Springs,

By WALTER E. TRAUFFER

Colo., for their 1948 mid-year meeting. The ready-mix board approved this selection and the dates, September 20, 21 and 22, for their consecutive meetings.

• Stephen Stepanian, in whose honor the National Ready Mixed Concrete Assn. has established a fellowship at the University of Maryland.

Safety Contest Mr. Ahearn also stated that the number of members who have sent in returns for the association's safety contest is disappointing and asked board members to urge other members to send theirs in. Awards for the winners in both classes, donated by PIT AND QUARRY, will be presented at the convention in Cincinnati.

Cost Accounting It was announced that arrangements had been made with O'Neal Johnson, a former producer and a certified public accountant, to develop standard cost accounting systems for both the gravel and ready-mix associations. A committee was appointed to study these systems.

Sales Agreement Regarding the work done to date on a standard sales agreement for the industry Mr. Ahearn said that no one plan can be devised which will fit all cases. He believes that it will be possible, however, to compile a list of things to be included in such agreements, from which each producer can select what he wishes. This list, which was prepared from nearly a hundred contracts sent in by members, will be completed and distributed soon.

Industry Problems Considerable time was spent at this meeting in the discussion of industry problems raised by federal law. These included: the Labor-Management Relations Act, 1947, and necessary revision of "Standard Labor Contract Clauses" to accord with this law; the Portal-to-Portal Act; current study of exemptions under the Wage-Hour Law for executive and administrative employees, etc.

Stepanian Fellowship Stanton Walker, director of engineering, proposed to the directors that the association establish a research fellowship at the University of Maryland similar to the one established by the N. S. G. A. This would provide for the appointment of a graduate student to do two years' work towards his Master of Science degree, spending half his time on problems of the ready-mixed concrete industry. The fellowship would provide $750 annually plus fees, books, etc. and would be automatically renewable. It was suggested that this be known as the Stephen Stepanian Fellowship of the N. R. M. C. A. It was voted unanimously to name the fellowship in honor of this pioneer of the industry and to complete the necessary negotiations with the university.

Short Course It was proposed at this meeting that the association hold another short course similar to the one held last year at the University of Maryland. It was agreed that the course this year be restricted to discussions of problems involved in the design of concrete mixtures and that it be held November 17 through 22. It is open to members of both asso-

(*Continued on page* 131)

Toledo Operator Effects Big Savings With New Haulage Unit

By ROBERT W. SPAKE

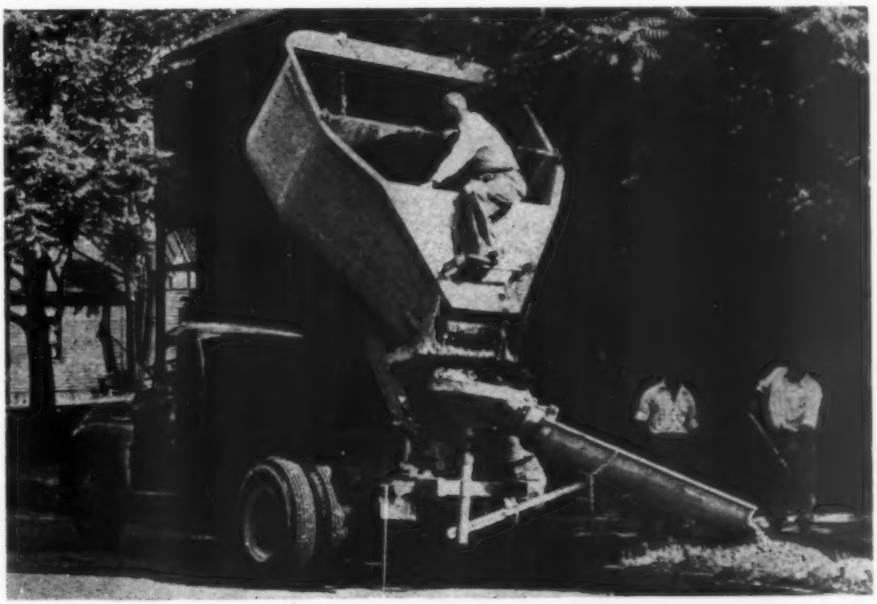
another ON THE SPOT report

REGULAR readers of THE CONCRETE MANUFACTURER are already familiar with the experiences of J. A. Nicholson, Toledo, O., ready-mix operator and pioneer in the dump truck haulage of air-entrained concrete. Readers will remember the story in the April, 1945, CONCRETE MANUFACTURER, discussing Mr. Nicholson's Toledo plant and the special dump body developed at that time.

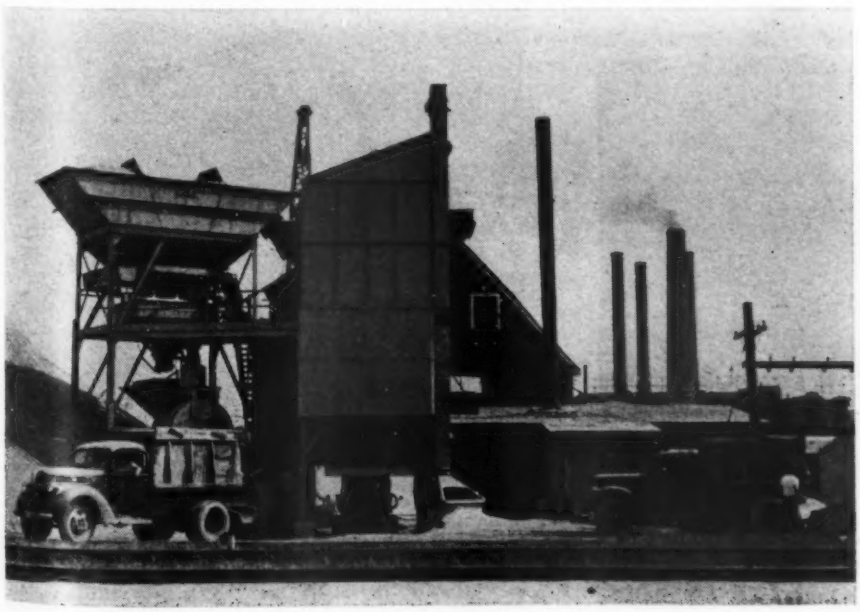
His experience, gained in the hauling of more than 100,000 cubic yards of air-entrained ready-mix concrete since the appearance of the 1945 article, has resulted in the development of a new, radically different dump body, incorporating many unusual features.

The new dump body, manufactured by the Hercules Steel Products Co., Galion, O., is of the high lift variety. It makes use of rounded corners and sides, a large rear gate, and tapered construction to achieve a high rate of discharge—a 4-cu.-yd. load can be discharged in one minute. Insulation between the double walls of the body prevents freezing of the concrete in cold weather.

Most unusual, however, is the use of a baffle plate and a specially-angled cover plate (over the rear of the body) which forces the concrete to act as its own scouring agent, insuring a clean and complete dump of the load. This can perhaps be better understood by referring to the accompanying photograph showing the body in dumping position. When the body of the Hercules concrete dumper is raised to the discharge position, the central baffle board divides the body, making it, in effect, a two-compartment hopper. Friction prevents the concrete in the two hoppers from immediately finding its own level, as does the rapid discharge of concrete from the bottom compartment. Material rushing under the baffle from the upper, or forward, compartment effectively scours the bottom of the body, and at the same time agitates and remixes the concrete. The first cubic foot drawn is identical with the last, and both units are as well mixed and proportioned as when they were discharged from the central mixer. An 8-ft. chute attached to the rear of the truck easily handles the flow of materials at maximum discharge and permits the concrete to be spouted where desired. The angle of the chute is adjustable by a ratchet-notched bar sliding in a suitable notch. If desired, the chute need not be used, and the load may be discharged directly from the pivoted receiving pan below the gate, into buggies or wheelbarrows. Three of these new Hercules units, mounted on GMC 473 trucks, are now in use by the Nicholson Concrete Co. in Toledo.



• Mr. Nicholson watches the scouring action at the base of the baffle board.



• A general view of the riverside plant of Nicholson Concrete in Toledo.

Mr. Nicholson claims that a considerable saving is involved by the use of dump-units, for in his experience five such units will do the work of seven agitator or transit-mix trucks.

An additional advantage is that these new dump units may also be used to haul sand and gravel. The possibilities of this will be immediately apparent to operators plagued with rainy weather, when "report-time" must be paid to drivers, who are, nevertheless, also deprived of a portion of their pay check. When dump trucks are used, work can often be found that will at least

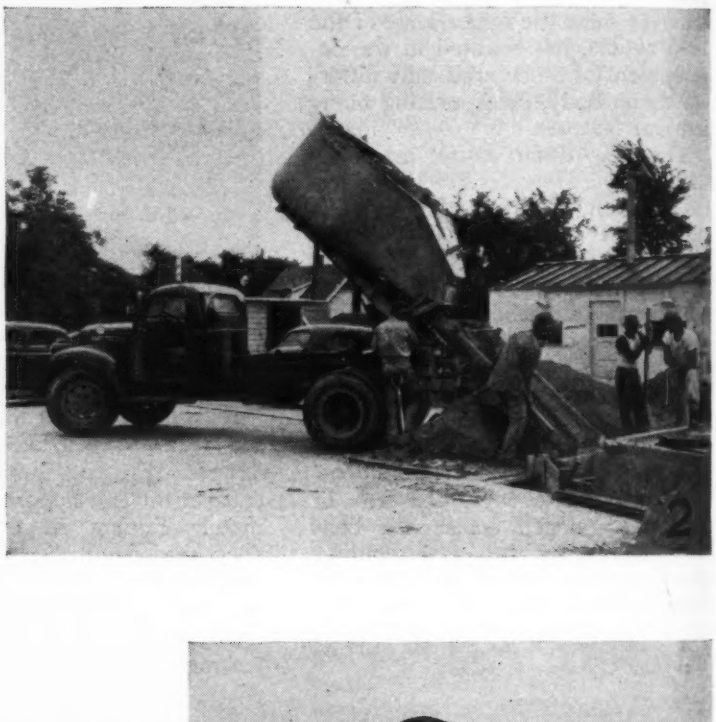
keep the men occupied for the "report-time," and possibly for the full day. Not only does this give the operator labor for value received, but the full day's pay thus made possible on rainy days should tend to keep labor relations on a happier plane, and better drivers with the organization.

Mr. Nicholson personally feels that dump trucks offer many advantages. The original investment in trucks is less; a lower-rate driver is required; the equipment is multi-purpose (hauls aggregate, coal, etc.); it has a lower maintenance cost; there is less to go wrong; dump trucks are lighter, faster on the job.

Also to be considered is the fact that the development of central-mix operation with deliveries made in non-agitating equipment has made possible many "picked up at the plant" sales. This new business, beyond the pale of a transit-mix operator, has presented an opportunity for additional profit. Mr. Nicholson reports that 13 percent of his business in Toledo comes from contractors (and others) who pick up their own concrete. The pick-up system also makes it possible for contractors to pick up small job lots of ready mix—saving the operator from running back to the job with an extra quarter-yard of concrete.

The air-entraining cement used by Nicholson is supplied with the Vinsol resin air-entraining agent already ground in by the Silica, O., plant of the Medusa Portland Cement Co. As Nicholson is one of the largest individual users of cement in the Toledo area, arrangements have been made with the Medusa company to devote a special silo to the air-entraining cement used by the Nicholson company. This ensures a uniform quality of cement and prevents errors such as delivery of standard portland for air-entraining cement. Nicholson long ago standardized on one brand of cement, as it was found that this was the best way to produce uniform concrete. However, if policy or job requirements necessitate the use of

1. • J. A. Nicholson, ready-mixed concrete producer and inventor, watches the performance of his brain child in the field. 2. • A side view of the dump body at work. Operator controls both elevating and gate action from his station at the rear. 3. • The concrete flows easily from the dump body, and is chuted where desired. 4. • The body is sturdy and well-constructed. There are controls on either side at the rear.



several brands of cement, Mr. Nicholson claims that it is advisable to buy standard portland cement and introduce the air-entraining agent at the mixer. In order to insure uniformity of product when this is done, it is held advisable to use an automatic dispenser.

At Toledo, high-early strength cement is produced by the addition of calcium chloride at the mixer. Business that specifies either different aggregates from those used, or another brand of cement, is turned down.

The standard aggregates at Mr. Nicholoson's plant are slag (Ohio No. 4 and 3) and sand. It is felt that the sand is of especial importance. It should contain adequate fines, passing No. 30 and No. 50 sieves, if the concrete is to be hauled free from segregation. The chief objection to the use of slag as a concrete aggregate — harshness — has been eliminated by air entrainment, and some authorities now believe that slag concrete is the easiest air-entrained mix to haul in non-agitating equipment.

Adequate control over production, according to Mr. Nicholson, cannot be stressed too strongly for a central-mix operation where deliveries are made in non-agitating equipment. The plant must be able to produce uniform, consistent concrete, that is, within one inch in slump. In this type of operation there is no possibility of either adding water or drying up the concrete—it must be right when it gets to the job.

This control necessarily requires adequate weighing batchers, including scales. It is considered advisable to have mechanical devices for determining the moisture content of the sand. At the Nicholson plant this is taken care of by the use of Toledo scales and the $(SC)^2$ precision concrete control system of the Scientific Concrete Service Corp.

While it is true that a trained, alert mixer operator through proper visual control and care can produce consistent concrete, the mechanical aids eliminate to a certain extent this tremendous dependence on one man. At this plant, the superintendent, Kenneth L. Drew, is a trained concrete specialist, who insures the production of engineer-controlled concrete. Prior to coming with the Nicholson Concrete Co. he worked for nine years in the concrete testing section of a Toledo laboratory.

Sand is delivered to the plant by water (the company property is between the Maumee River and the tracks of the Pennsylvania railroad) by the Kelly Island Lime and Transport Co. The sand is dredged from the bottom of Lake Erie. At the plant a 1½-cu.-yd. Link-Belt crane unloads the barges and stockpiles the material. It is aired in this work by a 1-cu.-yd. Erie machine. The Link-Belt unit also is used to move aggregate material from the stockpiles to the 3-compartment Blaw-Knox aggregate bin.

Slag is delivered by truck from the Flint Street plant of the France Stone Co. in two sizes—minus ¾-in. and minus 1½-in.

Cement is delivered in bulk by trucks, and is placed in a 310-bbl. cement bin. A 12-in.-diameter screw, powered by a 10-hp. motor, delivers the cement to the weigh batcher.

The 3-cu.-yd. Smith tilting mixer is one of two processing machines. The other is a 1½-cu.-yd. non-tilting type. Mr. Nicholson states that he prefers the tilting model because of its faster discharge and its freedom from discharge segregation. The tilting mixer is both charged and discharged from the front end. Mixing time is usually two minutes. The mixer discharges directly into the trucks by gravity.

That the hauling of air-entrained concrete in non-agitating equipment is feasible has been adequately proven by the recent completion of a large industrial contract in Toledo by the Nicholson company. In this case a 2,000,000-bushel-capacity grain elevator was constructed for the National Biscuit Co. In all, 20,000 cu. yd. of concrete of 5-in. slump was hauled a distance of four miles in open-bodied dump trucks. The elevator walls are 118 ft. high and only 8 in. thick. For such slip-form work, quality concrete is essential and the completed structure—entirely satisfactory—is a monument to Mr. Nicholson's beliefs.

Incidentally, it was the use of a 4-cu.-yd. field hopper on this job and the agitation of the concrete as it was dumped into this hopper that gave Mr. Nicholson the idea for the new Hercules body; the idea that permits the substantial correction of any segregation that may occur during hauling, and eliminates any possibility of segregation due to discharge.

It is of interest to note that with non-agitating equipment 18 percent of the Nicholoson company's concrete is hauled less than three miles, 67.6 percent is hauled 3 to 6 miles, 12.3 percent is hauled 7 to 10 miles and 2.1 percent is hauled over 10 miles.

Strengths vary according to customers' requirements, but generally only a 6-sack mix will be supplied to persons inexperienced in the use of concrete. Strengths in this case are high—3500 p.s.i. or more—and are remarkably uniform. A 4¾-sack mix is used for paving work, and 4½-bag concrete is the leanest supplied under normal circumstances.

Record Concrete Demand Calls for New Equipment

Increased demands for ready-mixed concrete in the Terre Haute, Ind., area has put the Terre Haute Concrete Supply Corporation on a 12-hour working day, as reported by Charles P. O'Leary, president. Mr. O'Leary stated that his firm had recently added four 4-cu.-yd. mixer trucks and two dump trucks to its fleet and that five additional mixer trucks were on order.

All concrete produced at the plant is controlled through tests made at the Rose Polytechnic Institute by R. E. Hutchins.

Idaho Plant Makes New Type Of Block with Volcanic Sand

The Harvey Tile Company, whose new plant is located near Klamath Falls, Ore., is reported to be in production, turning out building block of two sizes, standard and a smaller veneer tile. The daily capacity, when full production is reached, will be 3,600 standard units or 7,200 of the small type.

The owners—Herbert and Howard Graham and Harvey Borgman—state that they are making their products of volcanic sand, which is lighter than ordinary sand and somewhat heavier than pumice.

Irrigation Pipe to Be Made At $50,000 California Plant

Carl W. Weller, a well-drilling contractor of Coalinga, Calif., has begun construction of a concrete pipe plant near that city. Some of the equipment has been secured and installed, and other pieces have been ordered.

It is estimated that the cost of the new plant will be approximately $50,000. Installations will be fully automatic. The product will be irrigation pipe in sizes from 6 to 2 inches.

Denver Block Plant Operator Makes Marble-Faced Units

The manufacture of a new type of lightweight building block has been launched by the Denver Cement Products Company, as announced by Jacob S. Miller, proprietor.

The units, 8 by 8 by 16 inches in size, are faced with crushed marble from ⅝ to 1¼ inches in thickness. Composition of the new block is cinder, sand, gravel and cement; and it is available in four colors—black-and-white, pink, green and white.

Interlocking Concrete Roofing Tile Made by Utah Products Concern

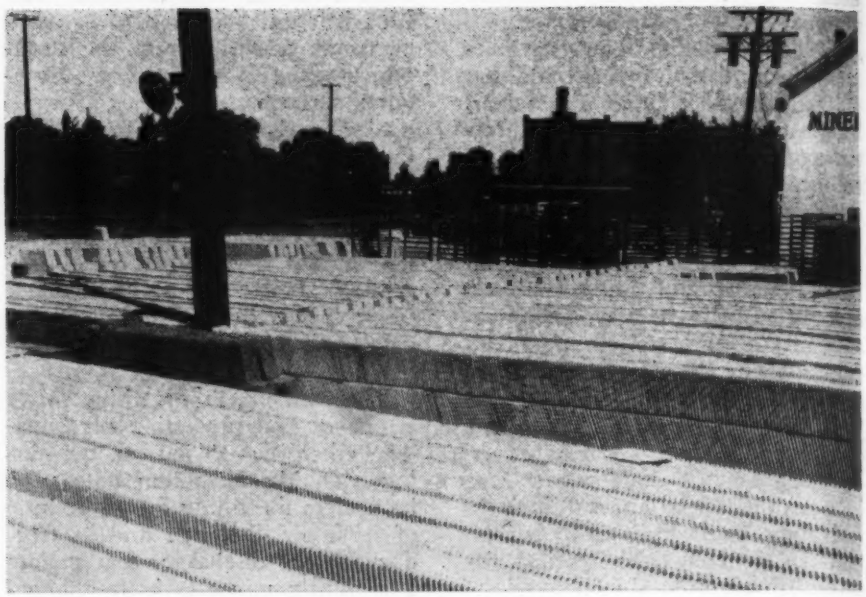
another ON THE SPOT report

SINCE 1924, Ralph Reed and his Rigid Roof Co. of Salt Lake City have sold and installed thousands of squares of roofing materials. The concern is known, not only in the Salt Lake area, but in scores of cities and towns within a

By HARRY F. UTLEY

400-mile radius; it maintains and operates warehouses and branch sales offices in 14 strategic locations throughout Utah, Wyoming, Idaho, and Colorado. Its sales force of 60-odd men write the orders, to be followed by the applicator crews which make the installations.

Early this year, while motoring through southern California, Mr. Reed's attention was drawn to a new type of tile roof. Tiled roofs of the rugged Spanish type have long been a familiar part of the California scene, but this new roof appealed especially to Mr. Reed because of its neat, streamlined appearance, suiting it to any type of structure. Investigation of the product—Bartile—led him to the offices of the E. P. Barber Co. at Bloomington, Calif. The Barber company manufactures the machines, pallets, and appurtenances needed to produce the new-type concrete roofing tile. Convinced that these interlocking units would meet with quick acceptance in his territory because



• A part of the storage yard at the Utah Bartile Manufacturing Company's plant in Salt Lake City, showing some of the tile awaiting shipment after they attain full strength.

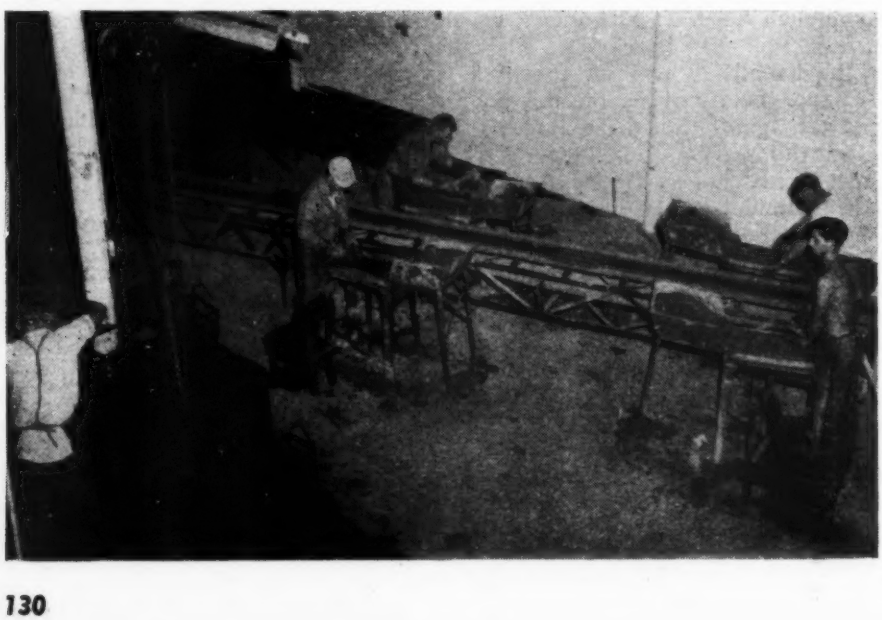
of their many obvious advantages—their distinctive, modern shape; their ability to resist fire, rot and rust—he placed an order for eight Bartile machines for installation in his plant at Salt Lake City.

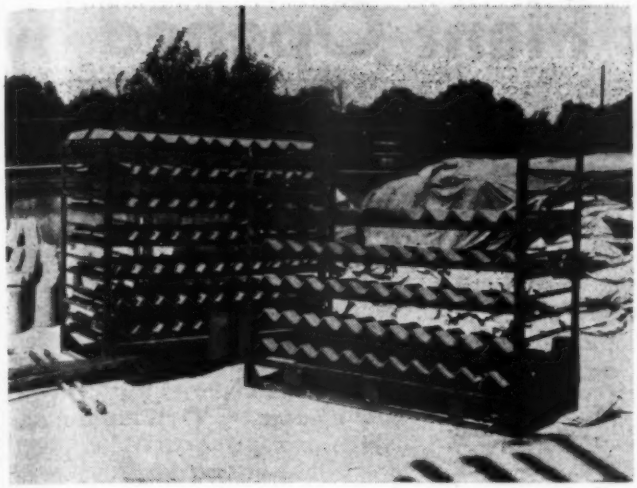
The new plant has been in operation now for several months and the Bartile roofing has been in tremendous demand ever since. Priced competitively with wooden and composition shingles, builders rapidly recognized the superiority of the Bartile roof. They got a good-looking roof which is truly permanent, simple to install without nails or adhesives, which never requires maintenance. The units can be produced in a wide variety of colors or in the neutral, slate-gray of concrete itself, although dark and light reds have proved the most popular. Mineral oxides are used to prevent the colors from fading.

The new firm is known as the Utah Bartile Mfg. Co., and Mr. Reed and R. J. McMurdie are partners in the venture. Now that the Salt Lake City plant is assured of success, the company is erecting a second plant at American Fork, Utah; eventually branch plants will be established in connection with all 14 warehouses in the surrounding states. The company has obtained the exclusive right to manufacture the roofing and to sell Bartile equipment in the states of Utah, Idaho, Wyoming, and Colorado.

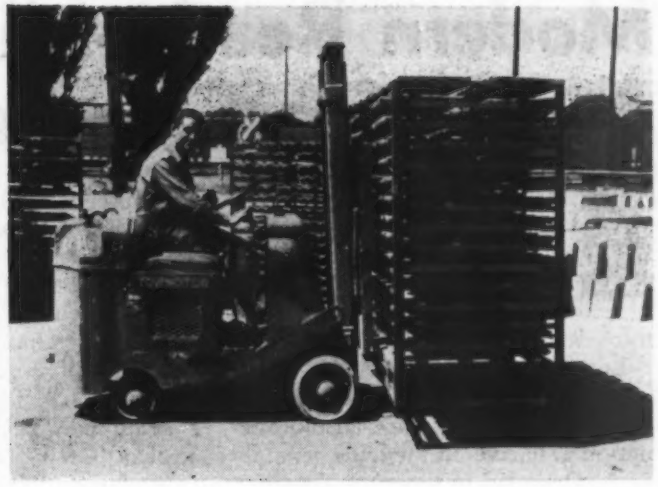
The Bartile machines are portable and can be moved in or out of production as the demand requires. When the Salt Lake City plant is in full operation (as it usually is) all eight machines are arranged, four on each side of a 24-in. by 36-ft. belt-conveyor which serves as an off-bearer. The belt is driven at a speed of about 30 ft. per min. Each machine operator lays the finished, palleted tiles on the belt, which carries them to an empty rack, to be stacked by two men. The all-welded steel racks (there are 48 in use at the plant) were built to company specifications and accommodate 240 tile when fully loaded.

• Four of the Bartile machines in operation along the off-bearing conveyor. The pallet oiler is at the left.





• For the rakes and ridges shown above special pallets are used.



• A lift-truck handling one of the racks in the storage yard.

Concrete is mixed in a Jaeger 6-cu.-ft. drum-type mixer and the hoppers of the machines are kept filled by men who wheel the mixture to the machines in barrows. A rich, 1:2 mix of hydro-plastic cement and washed plaster sand is used and an admixture, Anti-Hydro, is added in the amount of one pint to each 2-sack batch. This yields a mortarlike concrete which produces tile with a hard, flint-like surface finish that has an extremely low rate of absorption and high transverse strength. A Towmotor 2-ton gasoline-powered lift-truck handles the loaded and empty racks, each day's production being stripped from the pallets on the following morning. The units are then stacked in the yard and allowed to cure for a 3-week period before they are shipped to the job. During the summer curing in the yard has been aided by sprinkling at 4-hour intervals, but by the time freezing weather sets in, the company expects to have a battery of steam-curing kilns in service. These will assure better control of curing and make year-round operation feasible.

• R. J. McMurdie (left) and Ralph Reed (right) pose before a rackload of freshly-made tile.

The company has 10,000 steel pallets on hand and nearly all of these were in use on its best day of production when 9,765 individual tile were made in an 8-hr. working day. This required the services of 17 workers—eight on the Bartile machines, two rack-loaders, two concrete wheelers, a mixer man, the lift-truck operator, and three men working in the yard. Pallets are re-oiled each time they are used, being immersed, 175 at a dip, in a steel tank containing light fuel oil.

As with other of Mr. Reed's business ventures, the company operates on a profit-sharing basis, and the employees are therefore hard and willing workers. Plant operations are carried on under the supervision of O. H. Rasmussen.

Utah is this year observing its centennial, for it was on July 24, 1847, that Brigham Young, leading his band of Mormon followers, stood on an eminence overlooking the present site of Salt Lake City and the surrounding basin and proclaimed: "That is the place!" The Utah Bartile concern got into operation just in time to erect an impressive display of its product in the Industrial Arts Building of the Centennial Exhibit on the State Fair Grounds at the edge of Salt Lake City, where it has been viewed by hundreds of thousands of visitors during the year.

Nat'l R. M. C. Assn.

(*From page* 126)

ciations. In 1948 it is planned to present a more general course like the one in 1946.

Laboratory Investigations Mr. Walker then reported on current laboratory investigations. In studying the effect of time of mix on volume change of concrete after hardening it is found difficult to determine the change before hardening. He also said that the first group of tests has been made on the effect of admixtures and that a study has been completed on the effect of sand grading on the durability of concrete. Other similar studies are to be made. A study will also be made of the effect of the temperature of cement on concrete, and later reasons for heat in cement other than that caused by grinding may also be investigated. Mr. Walker said that there is need for more study of concrete mix design, especially the effect of concrete proportions on concrete. More, he said, also needs to be known about gap grading.

General Plans were also discussed for revisions in the association's manual and the booklet on *Control of Quality of Ready Mixed Concrete.* It was decided to combine the two books into one more complete publication and eliminate existing duplication in the text.

Mr. Walker also pointed out that the revised A. S. T. M. specifications for ready-mixed concrete provide for non-agitating haulage with some limitations on the time of haul, slump, types of mix, etc.

At this meeting Nathan C. Rockwood was unanimously elected an honorary member of the board of directors and of the association in honor of his many years of service.

In building Boulder Dam enough concrete was used to build a broad highway across the United States.

Modern Ready-Mix Plant Opened by Pacific Coast Aggregates

By HARRY F. UTLEY

another ON THE SPOT report

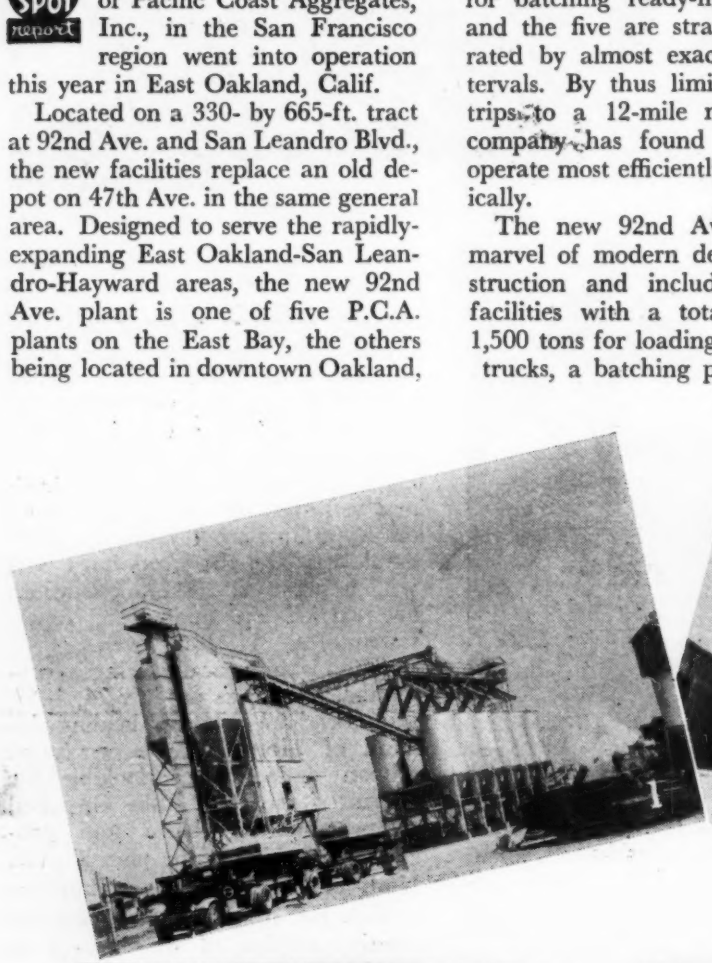
A NEW link in the chain of modern distributing plants of Pacific Coast Aggregates, Inc., in the San Francisco region went into operation this year in East Oakland, Calif.

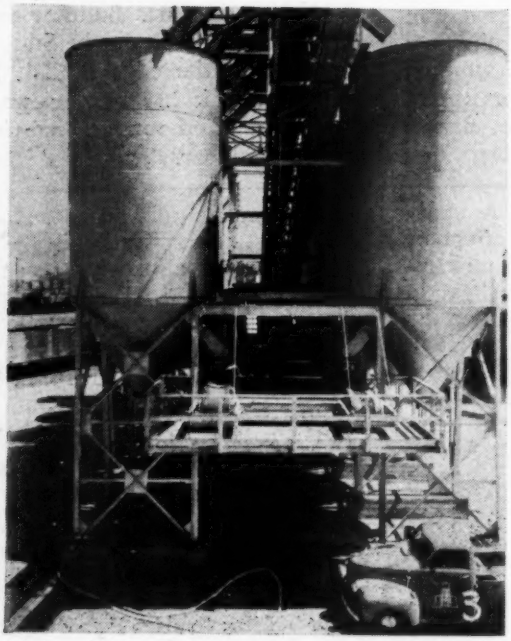
Located on a 330- by 665-ft. tract at 92nd Ave. and San Leandro Blvd., the new facilities replace an old depot on 47th Ave. in the same general area. Designed to serve the rapidly-expanding East Oakland-San Leandro-Hayward areas, the new 92nd Ave. plant is one of five P.C.A. plants on the East Bay, the others being located in downtown Oakland, in Emeryville, Berkeley, and Richmond. Each plant includes facilities for batching ready-mixed concrete and the five are strategically separated by almost exactly 6-mile intervals. By thus limiting its round trips to a 12-mile maximum, the company has found it is able to operate most efficiently and economically.

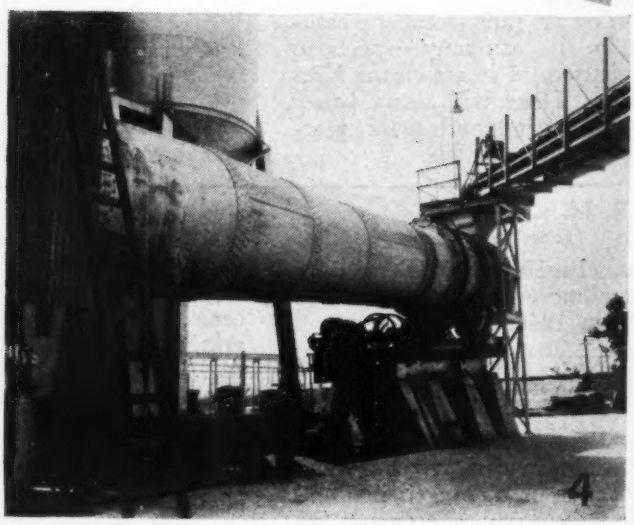
The new 92nd Ave. plant is a marvel of modern design and construction and includes bin-storage facilities with a total capacity of 1,500 tons for loading out aggregate trucks, a batching plant which can easily proportion 100 cubic yards of concrete materials into the truck-mixers hourly, a drying-and-bagging plant, a building-materials warehouse with over ½ acre of floor space, and a modern garage and maintenance building.

R. K. Humphries, assistant general manager, J. D. Kaufman, operations manager, and Walter Saxe of the Conveyor Co., Los Angeles, collaborated in the design of the new facilities.

Aggregates, already processed, are received either by rail or truck and come for the most part from the company's Eliot plant located 25







1. A view of the East Oakland, Calif., plant of Pacific Coast Aggregates, Inc., showing bulk cement being received by truck and trailer.

2. Another plant view, showing paved driveways. The Mix-Kwik plant is at the left; the 12-bin bunkers at the right.

3. Storage bunkers seen from the batch-plant floor. Note the facilities for truck loading and side gates feeding the two reclaiming conveyors.

4. The rotary drier, showing the method of feeding directly off the belt conveyor.

miles to the east. The spur track on the property has storage capacity for nine carloads of material and the aggregates are dumped into a common truck and track hopper with a capacity of 40 tons. A gate at the bottom feeds the material to the 24-in. by 265-ft. conveyor which runs up to the top of the batch-plant bin. This square steel bin is divided into six compartments, each of 60-ton capacity. A swivel chute directs the material into the proper bin compartment, or the entire load may be diverted to another 24-in. by 100-ft. belt which runs to the top of the 12 storage bunkers, each of 125-ton capacity, where distribution is handled by a shuttle conveyor. These steel bunkers, 20 ft. high in cylindrical section with 8-ft. conical bottoms, are arranged in parallel rows of six each and serve as commercial aggregate truck-loading bins. They also provide a constant reserve supply for the batch plant, two reclaiming belts at the bottom of the bins being arranged to feed back to the main conveyor supplying the concrete plant. All conveyor belts were furnished by the American Rubber Mfg. Co. The gates feeding the reclaiming conveyors, the swivel chute above the batch-plant bins, as well as all other points of material flow are under remote control from a master station located high above the plant operations.

The batching plant is equipped to use bulk cement, which may arrive either by rail or truck, and is stored in two 500-bbl. elevated steel silos. It was built by the Conveyor Co. especially to fit the needs of this particular plant and is automatic in operation. Almost any conceivable mix may be proportioned into the 5-cu.-yd. weigh hopper from the 6-compartment aggregate bin, with a choice of cement from the two cement silos. Weights of the ingredients register on two Kron dial scales, one for aggregates and one for cement. A circular fluorescent tube superimposed on the scale dial energizes a photo-electric cell and, as the indicator reaches the desired weight, marked by the position of the cell, it cuts off the light to the cell and, by relay, instantly stops the flow from bin to batch box. Gates are air-ram operated and are electrically controlled.

Any or all of the company's East Bay fleet of 20 Smithmobile 5-cu.-yd. truck-mixers may be charged at the plant. An efficient dispatching system plus instant communication between the office and operating floor make it possible to batch out quickly. Drivers never need leave the cabs of their trucks while they are in the yard.

An interesting part of the 92nd Ave. operations is the "Mix-Kwik" plant which prepares packaged dry-batched concrete, mortar, and special sands.

Aggregates are supplied from the storage bunkers and are transported by a 75-ft.-long conveyor to the Mix-Kwik plant, discharging to a 7- by 50-ft. direct-heat rotary drier fired by a Ray burner which can burn either gas or oil. The drier can be regulated to revolve at speeds from 6 to 12 r.p.m. depending upon the size, feed, and moisture content of the material. Output runs from 30 to 75 t.p.h. and the fully-dried aggregates are stored in covered steel bins of the same size and type used in the storage bunkers, except that these six 125-ton bins, with one exception, are divided into two compartments to provide 11 separate dry-storage units. Coarse aggregate up to ½ in., various sizes of sand, and cement are stored in the bin compartments. The same elevator that raises the dried aggregates to the bins is used to handle the cement, which arrives by truck, since the dried aggregates leave the bucket surfaces clean. Sand is re-

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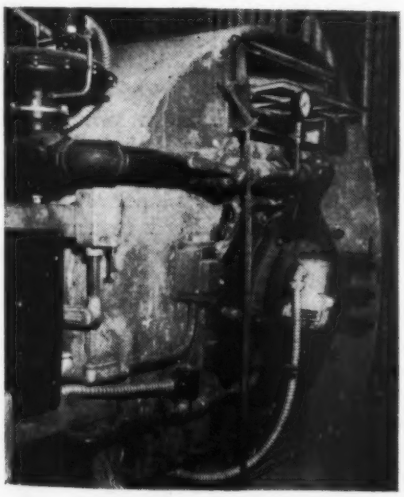
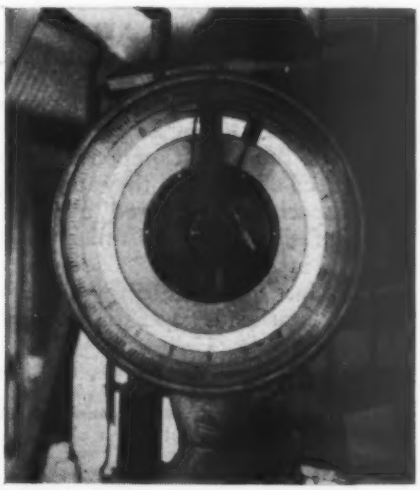
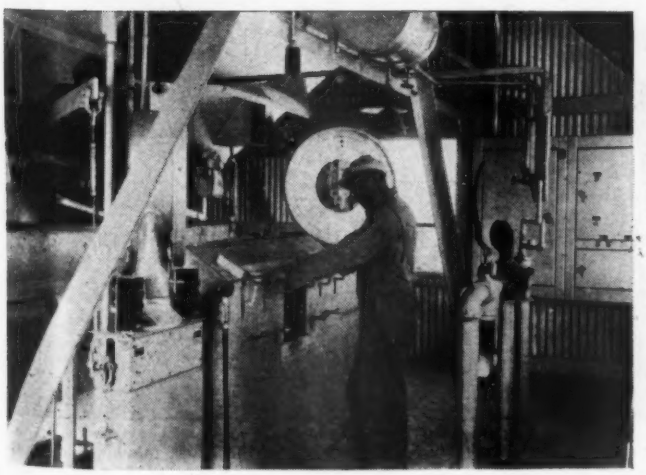




- **Left: The burner on the rotary drier; it can burn either gas or oil.**
- **Right: The dial of the scale, showing the circular light tube, the pointer and the electric eye which automatically cuts off the flow of material when the desired weight is reached.**
- **Below, left: An operator at the controls on the floor of the batching plant.**
- **Below, right: An operator at the controls of the bag packer in the Mix-Kwik plant. Note the three electric vibratory feeders above, which accurately proportion the dry concrete and mortar ingredients.**



Florida Block Firm Uses Nine Machines For Wide Range of Types and Sizes

• A general view of the Edgar Brothers concrete block plant near Daytona Beach, Fla. Although in most outward respects a relatively small operation, this plant has the surprisingly high output of about 1,600 units per hour.

another ON THE SPOT report

ON a field trip into Florida some months ago we were interested and astonished to come across a block plant which is set up to produce on short notice any of 32 distinct sizes and types of concrete masonry units. The plant, located just outside the corporate limits of Daytona Beach, is operated by Edgar Brothers Concrete Products Company. The owners claim that they produce more special shapes and a wider range of sizes than any other block concern in the state.

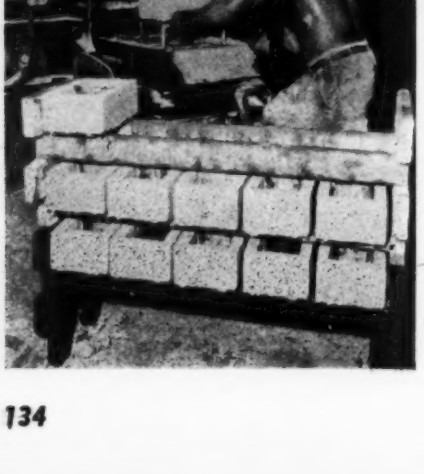
By WILLIAM M. AVERY

This far-from-common versatility is made possible by operating an unusually large number of production units—six molding machines in regular operation, and three on standby for making special shapes and sizes. It is thus possible most of the time to shift any desired portion of the plant capacity to specials without incurring the delay usually entailed in changing over machines. The operator merely shifts over to one of the standby machines and production continues with almost no perceptible interruption.

The firm was established in 1923 by the father of the present owners, and operations have been continuous since that year. F. Edgar and D. F. Edgar, brothers took over the business in 1941, and they have expanded the capacity of the plant to its present level of about 1,600 units per hour. A third brother, Wiley Edgar, owns and operates Edgar's Block Machine Works at nearby Ormond, Fla., and the nine machines operated at the Daytona Beach block plant were all supplied by him. These are the Edgar Vibra-Shaker machines which are widely used by block plants in Florida and the Southeast.

The block concern produces its own aggregates (coquina shell and sand) in separate pits located a few blocks from the plant. Aggregate production is geared to their own immediate requirements, and amounts to about 40 cubic yards per day of shell and 20 cubic yards of sand. The shell is recovered from under water with a Hisler ½-cu.-yd. dragline and sized on a ¼-in. vibrating screen. In order to insure

• One of the double-unit molding machines in production on 5- by 8- by 16-in. block. Masonry units of this size account for 30 percent of the output of the plant.



• This 20-cu.-ft. mixer, located on an elevated platform above the block machines, has been stepped up in horsepower and speed to keep pace with the demands of 6 molding units.

• Aggregates (coquina shell and sand) are trucked from the company's own deposits to a covered storage area. The materials, including cement, are fed to the mixer by the skip hoist in the background.

recovering only clean, sound shell, the upper layer of the deposit is stripped down to water level and cast aside. One man is employed constantly in loading and hauling materials to the plant.

The aggregates are dumped into sheltered storage piles just outside the plant building, and shoveled into an inclined skip hoist which discharges inside the building. Bagged regular Portland cement is also added to the skip hoist outside the building (see cut). Ordinarily no admixtures are used, but during the winter months small amounts of calcium chloride are added to the mix.

Mixing is done in a Pecco Efficiency mixer located on an elevated platform above the block machines. The mixer can discharge directly into a hopper which feeds three of the molding machines, or into a small larry car which conveys material to the remaining machines. In order to supply six machines it has been necessary to reduce mixing time to about 2½ minutes, or about half the minimum usually accepted as good practice by the industry. When we inquired if any loss of strength had been incurred, it was explained that an extra large motor, operating at higher speed, has been installed to compensate for the reduced mixing time. That this compensation was adequate is indicated by the fact that on 7-day tests the units showed compressive strengths ranging from 1,100 to 1,400 p.s.i., as compared with the Daytona Beach code requirement of only 800 p.s.i.

Wooden racks, carrying twenty 8-inch equivalents, are handled in the plant and on the storage yard with three Yale & Towne hand lift-trucks and one Barrett-Cravens. There is storage space for 9,000 units inside the plant building and for several times that number on the yard. The units are sprinkled on the yard for a period of three days, and held for a total of 28 days before they are shipped. Two flat-bed delivery trucks, with capacities of 400 and 300 units, are operated by the company. Although deliveries are made within a radius of 15 miles, by far the major share of output is delivered within, or in the immediate vicinity of, Daytona Beach.

By stocking so wide a range of special sizes and shapes, and being set up to produce them on short notice, Edgar Brothers feel that they are offering a service which will in normally competitive times bring them an important share of the local block business. With competitive selling already back in vogue, we suspect that other block manufacturers will sooner or later reach the same conclusion.

Nebraska Concrete Industry Featured by Unique Display

A novel "photoette miniature" display was shown for the first time at the 1947 Nebraska state fair, August 31 to September 5, at Lincoln, depicting the plants and manufacture of concrete products by the Western Concrete Products Co. and Reimers-Kaufman Concrete Products Co., both of Lincoln. The displays were set up at the Lincoln Chamber of Commerce after the fair, and will be exhibited at other places from time to time, according to Elsworth DuTeau, chairman of the publicity committee of the Lincoln C. of C.

Modern Ready-Mix Plant

(From p. 133)

sized above two of the 2-compartment bins by a Symons 4- by 16-ft. vibrating screen fitted with 4-, 8-, 12-, and 24-mesh cloth.

Aggregates and cement are withdrawn from the bins through 4-in. steel pipes which enter the bag-house through one wall to feed a Vreedenberg bagger. The bagger fills either valve-type or open-mouth paper bags and is mounted on rollers to move along under any of the spouts, each of which has a sleeve-equipped feed gate to serve the bagging machine. Dried filter and blast sands, bird and roofing gravels are packed 100 lbs. to the bag, while the dry-batched concrete and mortars weigh 90 lbs. per bag.

The dry-batched concrete—Mix-Kwik—is an all-purpose product designed to yield 3,000-lb. concrete when the proper amount of water, prescribed in the directions printed on the bag, is added. The dry-batched mortar — Mortar-Mix — is made up in the same manner, using properly-proportioned sand and Permanente Brik Mix, a special mortar cement.

Careful proportioning of the concrete and mortar mixes is accomplished through the use of three Syntron electric vibratory feeders. Mounted on a frame above the bagging machine, the feed of each ingredient is set and controlled to a high degree of accuracy by adjusting the rheostats which regulate the amplitude of vibration.

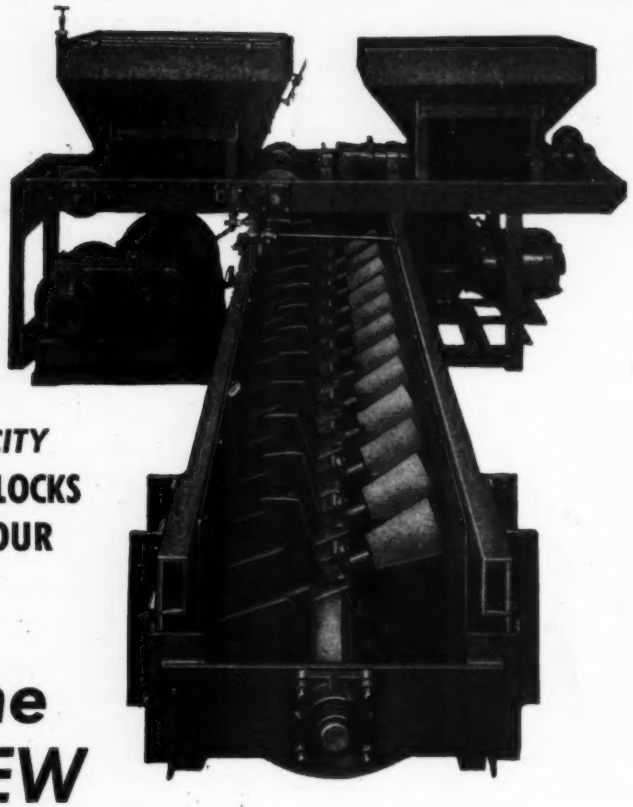
Mix-Kwik and Mortar-Mix are in tremendous demand, especially among home-owners who appreciate its convenience for doing small concrete jobs and repair work. An automobile association, too, is a big customer, purchasing large quantities for setting concrete sign posts.

The bagging department occupies a 40- by 140-ft. wing of an L-shaped warehouse structure containing 20,000 sq. ft. of floor space. The warehouse is used to store various types of other building materials and supplies handled by the company. Whenever possible, these commodities are palletized and handled by power-operated lift-trucks.

Under construction on the property is the company's huge new main garage and service building which will be used to maintain the whole of the P.C.A. fleet of trucks.

Building floors and driveways in the yard are paved with concrete, and bulk deliveries of aggregates are weighed on a new 30,000-lb. Fairbanks truck scale equipped with a Weightograph recorder.

Capable Companion Unit
FOR THE
MIGHTIEST BLOCK MACHINES



CAPACITY
1100 BLOCKS
PER HOUR

The NEW
KENT Stediflo MIXER

Out of decades of experience in building continuous mixers KENT has now produced an advanced unit that delivers sufficient concrete to serve the largest block machines in existence.

Although rated at 1100 blocks per hour, it has actually produced concrete for 10,000 grade A blocks in a single day.

In addition to delivering uniform concrete in a continuous stream with practically no manpower attention and consequently at a new low cost — Stediflo is *low* in first cost — *low* in installation cost — *low* in operating cost — and *low* in maintenance cost.

If you operate a large block machine you need a Stediflo to release its full capacity. If you own smaller machines there is a Kent Continuous Mixer exactly suited to its needs. Write for information.

The KENT MACHINE COMPANY
Manufacturers of CONCRETE PRODUCTS MACHINERY Since 1925
CUYAHOGA FALLS, OHIO, U.S.A.

NEW MACHINERY and SUPPLIES

● Boiler Treatment Service

Recently developed to correct scale, pitting, corrosion, priming and carry-over in boilers, is a product called "NoKeM." It operates by collecting and grounding out the existing electrical energy in the water.

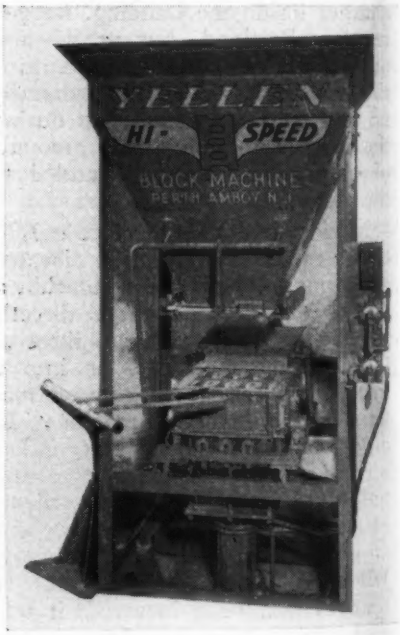
Once installed, it is claimed that no other treatment or replacement of parts is ever necessary. NoKeM is put out as a service and is leased to the user.

The unit is adaptable to any size boiler. Manufactured by NoKeM Engineering Company, Inc., 216 W. Washington, Louisville 2, Ky.

● Wartime Block Machine

The Yellen block machine, manufactured by John J. Yellen, Perth Amboy, N. J., is the result of a cinder block manufacturer's inability to secure equipment during the recent war. Lacking proper facilities, Mr. Yellen developed his own models, the one shown being the type currently manufactured.

The machine is a two-block type, with a 50-cu.-ft. hopper above the mold box. A gate at the bottom of the hopper is



Two-block machine.

operated on rollers and has an adjustable slot which allows the material to fall into all parts of the box while it vibrates. After 10 to 15 seconds of vibration the unit is shut off and the waste matter is struck off with a movement of the strike-off hopper.

The stripper now raises the blocks 2 inches above the box and an offbearer is swung under them to remove them. It

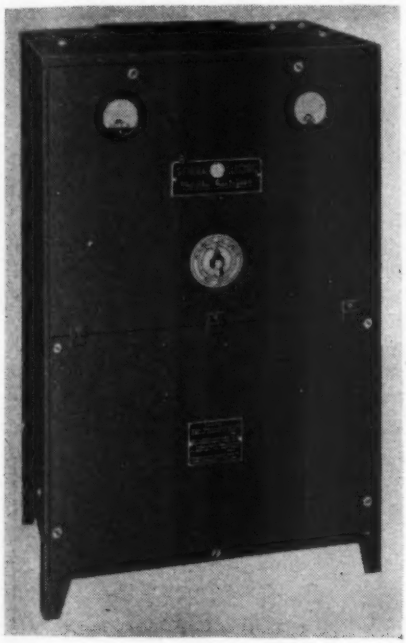
requires from 12 to 18 seconds to make two standard-size blocks. The machine can also make one 4-in. and one 12-in. block simultaneously or any combination totaling the volume of two standard units.

A 1-hp. motor powers the vibrating unit which uses eccentrics. The machine requires lubrication at only five points, including the motor.

• Battery Charger

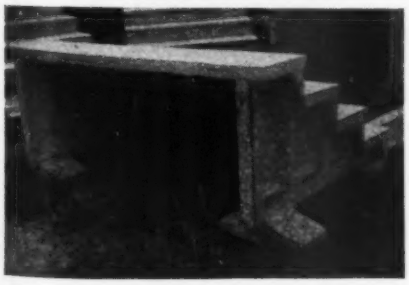
General Electric now offers its copper-oxide battery charger for electric truck batteries. The purpose of the rectifier is to change or rectify alternating current to direct current and supplying it at the correct voltage and current for properly charging industrial truck batteries.

The heart of the G-E battery charger is the copper-oxide rectifier stack assembly. Other essential elements are transformers, reactors, a time control, a main a.-c. contactor, a motor-driven fan, a two-rate voltage relay, a precision ammeter and a precision voltmeter. The device is fully automatic.



Rectifies current.

The various models furnished fall in two main groups: Group 1 "combination" chargers, and Group 2, chargers for nickel-alkaline batteries.



E. A. Rogge & Sons, Marinette, Wis., have developed a set of forms used for precasting concrete steps. Each step is cast as a separate unit, and, when assembled, is held in place by an interlocking lug.

Makes 600 units per day.

• Canadian Block Machine

The B.M. Engineering block machine, now in use in Canada, is a light, portable unit using standard size pallets for all types of blocks. It has a production capacity of 600 blocks per day with one man; two men can turn out over 1,000 per day.

An attachment mixes the concrete. Because the machine is movable, the blocks can be made and deposited on the spot while the machine moves on. This procedure obviates the need of lift-trucks and special racks.

The unit is driven by a gasoline engine. It can be knocked down in a short time for removal to another site. The movable plant can be operated out of doors, without racks. Simple adjustable devices proportion the gravel, cement and water.

Finger-tip control — pressing a small lever — releases the block from the mold, and it then descends to a roller system for offbearing. The machine is made by B. M. Engineering, 26 Queen Street, East, Toronto, Canada.

300
QUALITY BLOCKS PER HOUR WITH THE GRAVELEY BETTER-BUILT
CORONA
BLOCK MACHINE
• Sturdy
• Efficient
• Adaptable

There is one in operation near you . . . see it . . . before you buy.

OTHER GRAVELEY MACHINERY

- Four other complete plants, 125 to 800 blocks per hour.
- Concrete Mixers—6 to 28 cu. ft. capacities—or larger to your specifications.
- Hoppers • Conveyors • Lift Trucks
- Racks • Pallets • Racking Hoists

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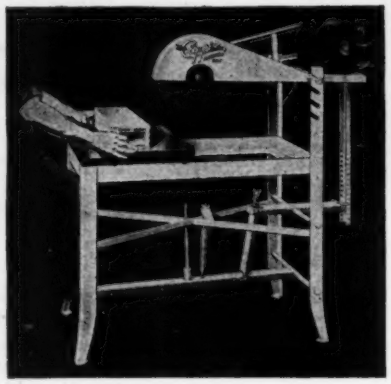
Cable Address: "GEWEHOFF", New York, U. S. A.

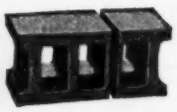
FASTER CUTTING ...with Clipper Masonry Saws

Your Special Size and Shape Brick or Concrete Block can now be "Tailor-Made" at a moment's notice!



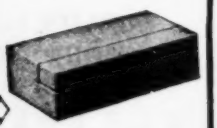
The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

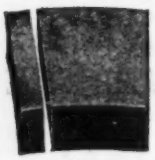
Here are a few typical examples of the speed and accuracy with which concrete products and fire brick can be cut.



This concrete block, converted into a special size, was cut completely in two in 19 seconds.

One of the many intricate cuts performed on first quality clay brick for heat treating furnaces —made in 8 sec.





Rotary Kiln Blocks, cut to size for "key" bricks in rotary kilns, require only 10 sec. for completion of cut.

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!

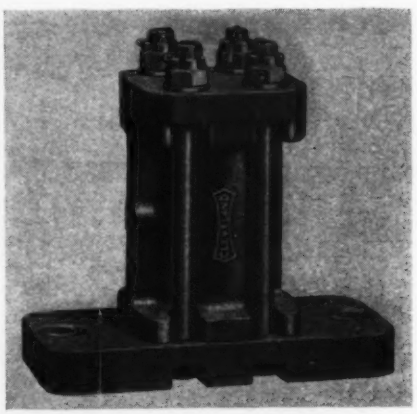
CLIPPER MFG. COMPANY
2801 Warwick, Kansas City 8, Mo.

Truck equipped with controller.

● Controller for Electric Trucks

Heavier unit loads now being transported and manipulated with electric power industrial trucks have required larger batteries and motors, which in turn, called for controllers of corresponding current carrying capacity, and faster positive action to conserve power and to safeguard the truck's mechanism.

To meet these requirements Elwell-Parker Electric Co., Cleveland, O., has developed a new type of controller, the "Rolotac," which is now available. Heart of the Rolotac is a series of nine trigger fingers which insure instant response and efficient transfer of current.



The Cleveland Vibrator Company, Cleveland, O., has developed a pneumatic vibrator for use on hoppers containing from one to several hundred tons of material. It is engineered to provide continuous or intermittent hammer-like blows. It is available from stock in horizontal or vertical mounting.

Dump Buggy

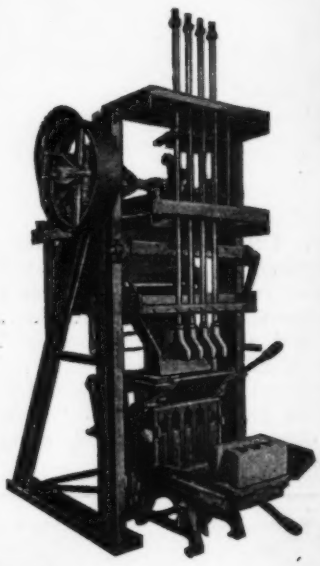
The Muller Machinery Company, Inc., of Metuchen, N. J., has developed a concrete buggy designed for easy dumping. It is claimed that the rocker design virtually eliminates kick-back when the buggy is tipped over.

The buggy has a capacity of 6½ cu. ft. and is equipped with 2-ply or 4-ply pneumatic tires.

● Cast Aluminum Pallets

The newly incorporated Permanent Mold Foundry, Inc., 16 Sprague St., Dayton 7, Ohio, is set up to supply a complete line of cast aluminum pallets, encompassing 12 sizes in all. Several size and dimensions are in stock, and ten-day delivery, or better is guaranteed.

The prevailing methods and types of equipment for producing ready-mixed concrete or concrete products can be found in the Concrete Industries Yearbook.



Recognized Everywhere

The Hobbs Jr. Face-Down Block Machine is recognized everywhere as the great general purpose machine of the concrete-products industry. Famous for its wide range of sizes and the variety of blocks it can produce. As illustrated, it is equipped with striking and finishing device, shown under the floor-type tamper and with power feeder.

Stearns Clipper Stripper Machines; Stearns Jolterete Machines; Stearns Mixers; Cast Iron and Press Steel pallets. Straublor oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
1191 Fairview Ave. Columbus, Ohio

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